TEXTILE MANUFACTURER

MATERIALS • PROCESSES • PRODUCTION • MANAGEMENT

Monthly: Two Shillings and Sixpence ESTABLISHED 1875 SEPTEMBER 1958

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a slight swing of the umbrella

You notice a certain jauntiness at times, even in the staid Mancunian. It is an expression of his underlying confidence, his belief in ultimate success whether the signs of the moment point that way or not. As a producer of textiles he has at his command a great fund of scientific knowledge and the techniques necessary to translate that knowledge into better and better fabrics. He finds all this, and more, in the comprehensive service offered by Bleachers' Association for the processing of textiles for a very wide variety of uses.

Bleachers' Association Limited

Enquiries to Commercial Department
BLACKFRIARS HOUSE MANCHESTER 3

BLEACHING
DYEING
MERCERISING
FINISHING
PRINTING

A typical installation of Westmorland Doublers producing Carpet Backing Yarns

The Westmorland
DOUBLER

for

Carpet Yarns
ON CONE OR CHEESE

1958 TEXTILE RECORDER International TEXTILE MACHINERY AND ACCESSORIES exhibition
BELLE VUE MANCHESTER 15-25 OCTOBER 1958

Stand 1422

The Westmorland Doubler can be adapted to process Tufted Carpet Yarns, Carpet Backing Yarns, Candlewick Tufting Yarns, etc., being fed by multiple end wound packages normally 8″ × 8″ on 1½″ bore tubes, but a 10″ traverse × 8″ diameter package can be applied if desired.

This means a completely knotless package can be doffed in cone or cheese form, ready for the tufting machine or other process. Maximum cone diameter 10″. Two turns for every revolution of the spindle are inserted, giving extremely high production, viz.: 3 fold 3s counts, inserting 3 T.P.I.

Approximate production per 44 hours from 36 spindle machine — 6,000 lbs. Woollen yarns and mixtures can be successfully processed on the Westmorland Doubler. We shall be pleased to run sample packages on request.

DODD
TEXTILE MACHINERY

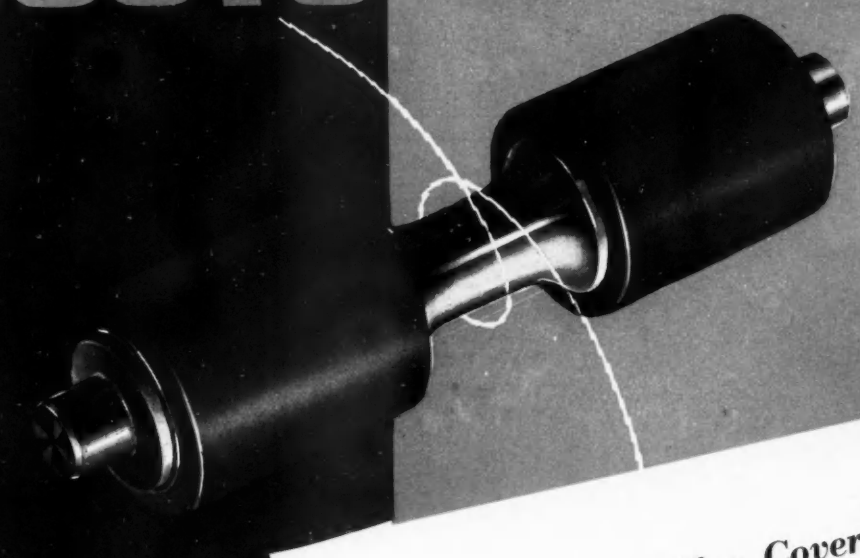
The Westmorland Doubler is manufactured under agreement by

S. DODD & SONS LTD.
LYON WORKS OLDHAM
Telephone: MAln (Oldham) 3617

GACOTS

TEXTILE ROLLER COVERINGS

PATENTE



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Gacots Textile Roller Coverings contain Surface Active Agents (British Patent No. 706,202). These ingredients prevent the build up of static electricity, thus preventing 'licking' and 'lapping'. The result is cleaner running, less waste and a general improvement in the finished yarn.

Angus research again leads the field in this development.

TECHNICAL SERVICE

Our staff of technical representatives are ready to visit your mill and make individual recommendations and provide follow-up assistance and advice.

ROLLER COVERING SERVICE

Gacots can be supplied to users in the United Kingdom, mounted and ground ready for immediate use, by our official agents and roller coverers :—

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WERNETH LEATHER WORKS
OLDHAM, Lancs.
TELEPHONE - MAIN 4085

TEXTILE EXHIBITION
BELLE VUE, MANCHESTER
SEE OUR EXHIBIT, STAND No. 1313

OIL SEAL DIVISION, COAST ROAD, WALLSEND-ON-TYNE

GEORGE ANGUS & Co LTD

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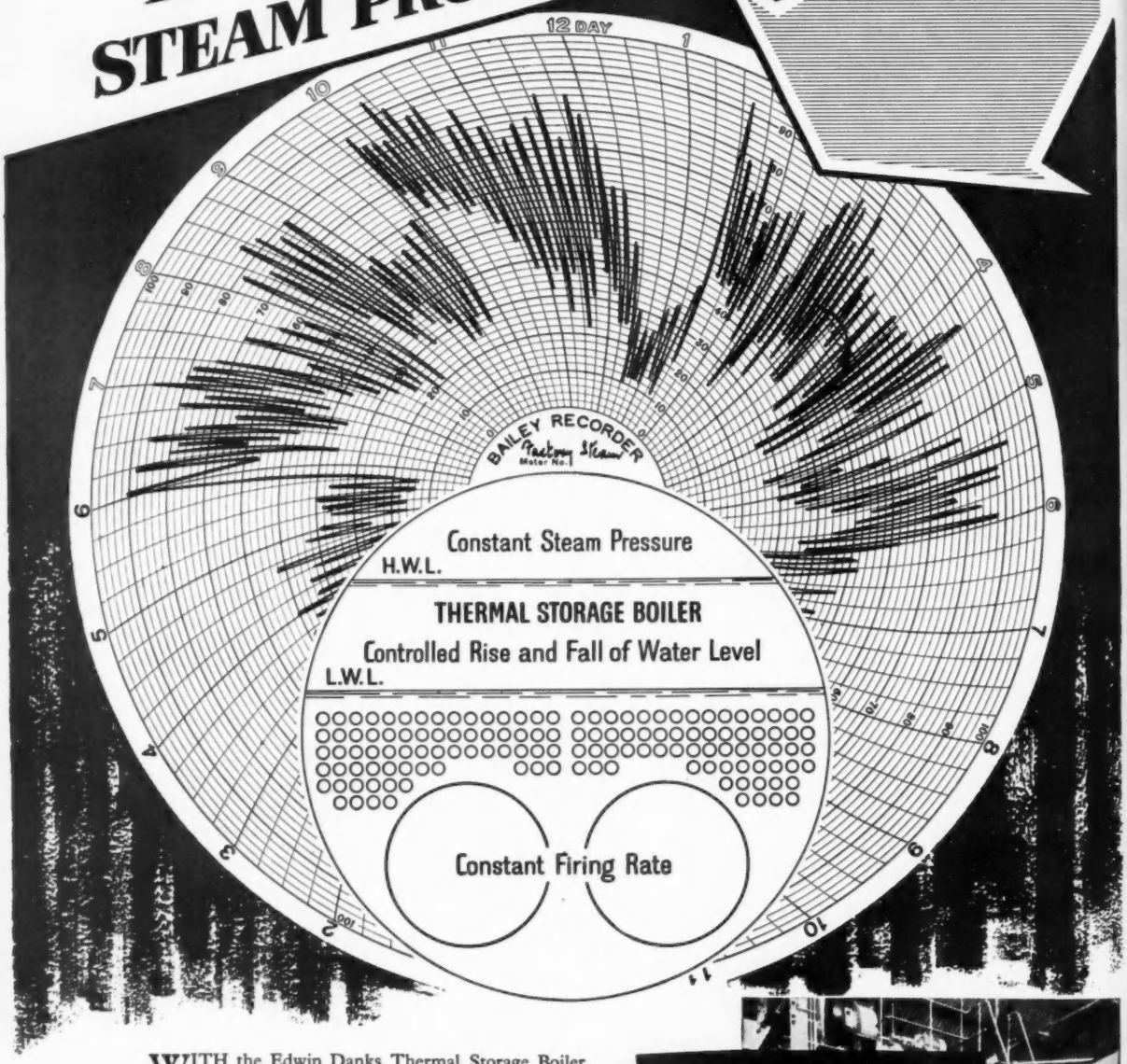
IS THIS YOUR STEAM PROBLEM?



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LEEDS : 21 Upper Mill Hill. Tel. : Leeds 2-5266

LIVERPOOL : 8a Rumford Place, 3. Tel. : Central 2068

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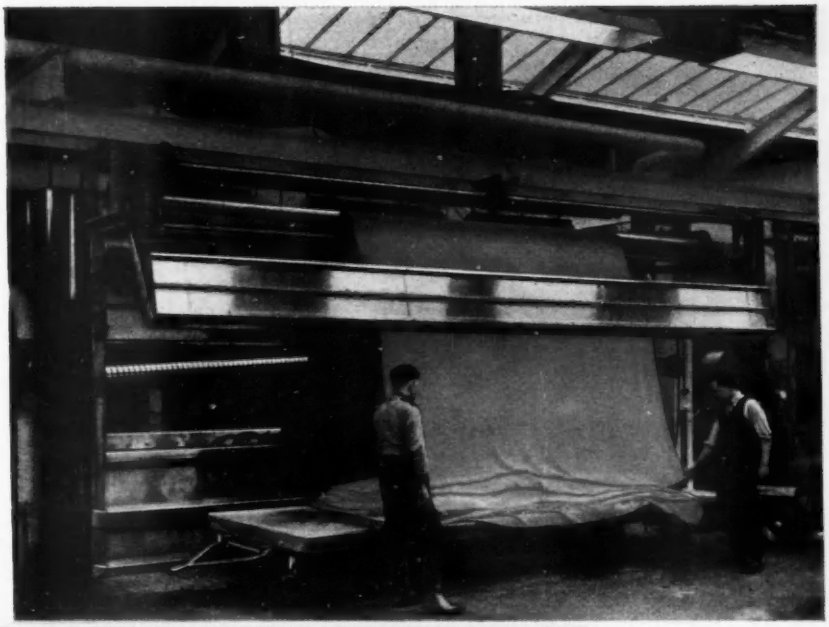
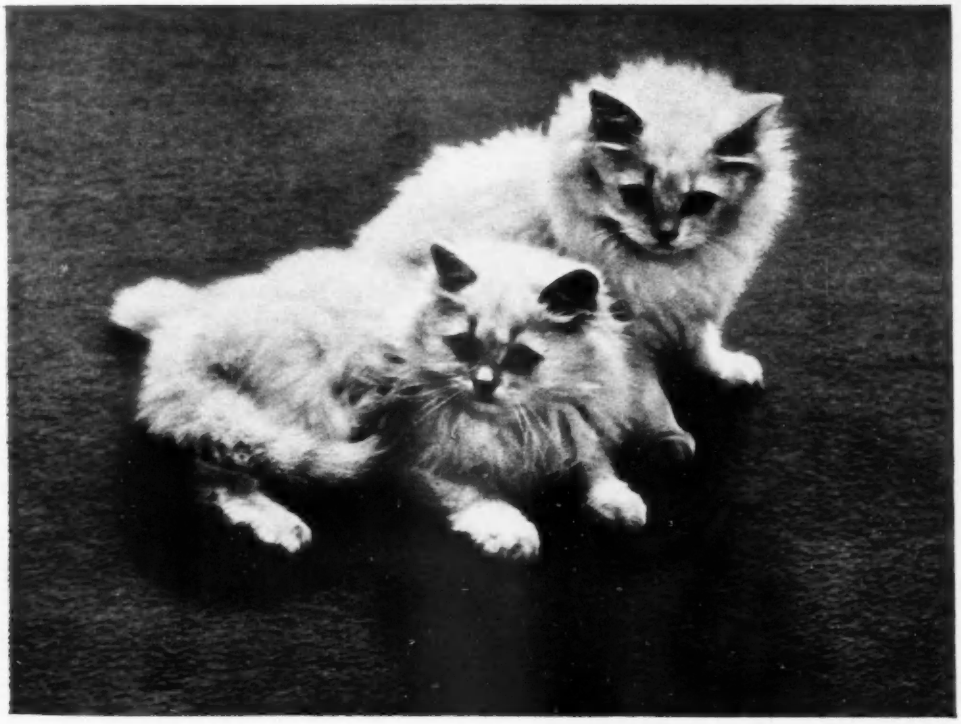
behind the scenes . . .





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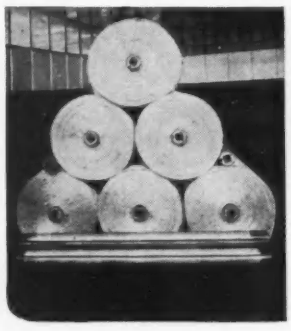
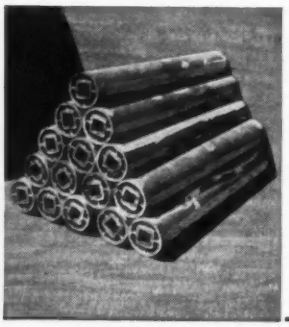
Photos: courtesy of Messrs. John Bright & Bros. Ltd., Messrs. Harwood Cash & Co. Ltd., Messrs. Firestone Tyre & Rubber Co. Ltd.





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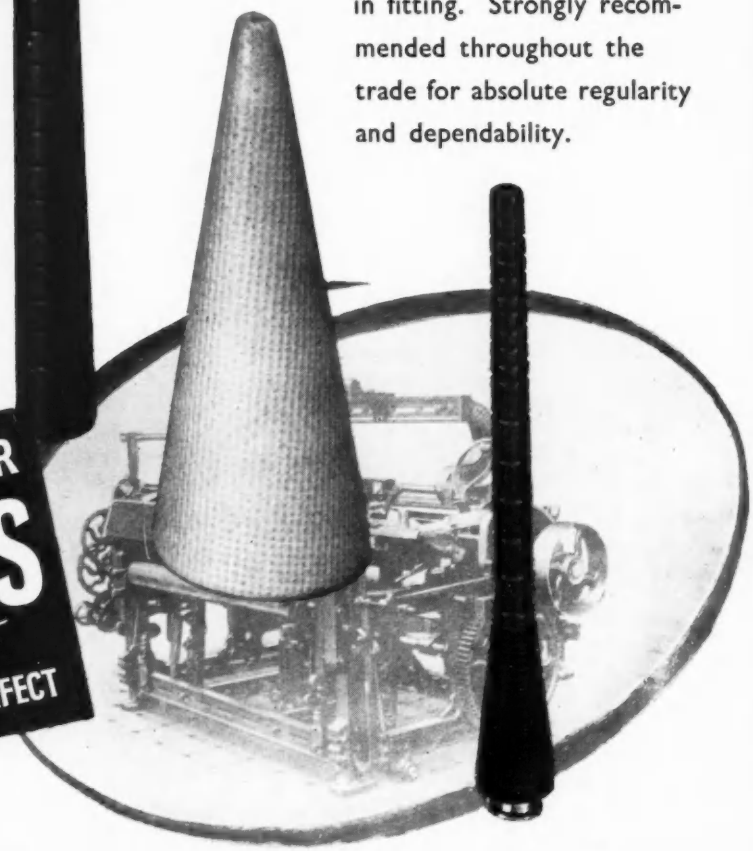

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For canteens

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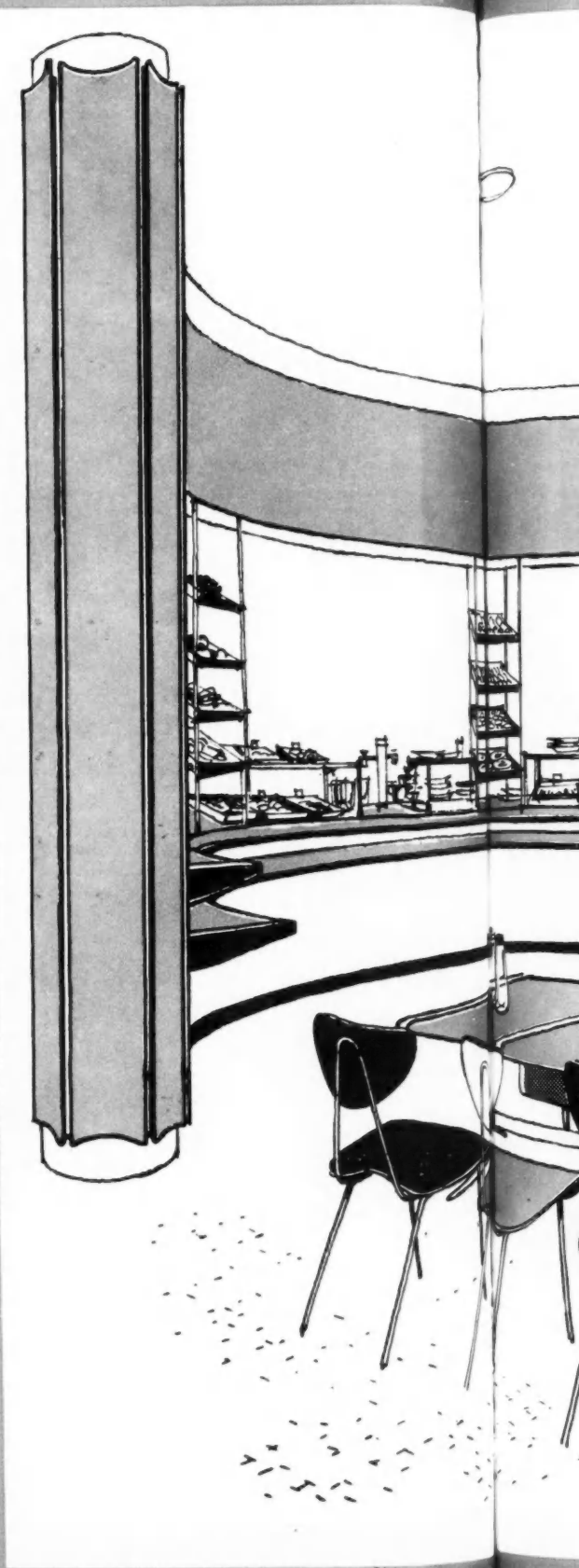
A glance at our picture will at any rate indicate some of the possibilities now open to you – possibilities which your architect or consultant designer will welcome, and which any good contractor can turn into reality by making use of the new process of 'post-forming'.

Most of the popular colours and patterns of FORMICA decorative laminates, charming and virtually everlasting, are now available in post-forming grades: you can have them curved or flat, with all the grace and added convenience that that implies. We offer some suggestions overleaf . . .



Suggested applications for canteens

Curved or flat wall panelling, with corners neatly turned.

Counters smoothly sweeping from back to rounded fore-edge.

Tables either flat or with rimmed or rounded edges.

Trolleys with curved service edges and protective rims.

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Write to your Area Manager (address below) for full details.

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Sales Manager: M. G. Farrant

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East Midlands	5 Gallowtree Gate, Leicester. *Tel: Leicester 21816*
West Midlands	6/7 Hockley Hill, Birmingham 18. *Tel: Northern 5540*
North West England	4 Albert Square, Manchester 2. *Tel: Blackfriars 3250*
North East England	85/87 Cookridge Street, Leeds. *Tel: Leeds 2-6489*
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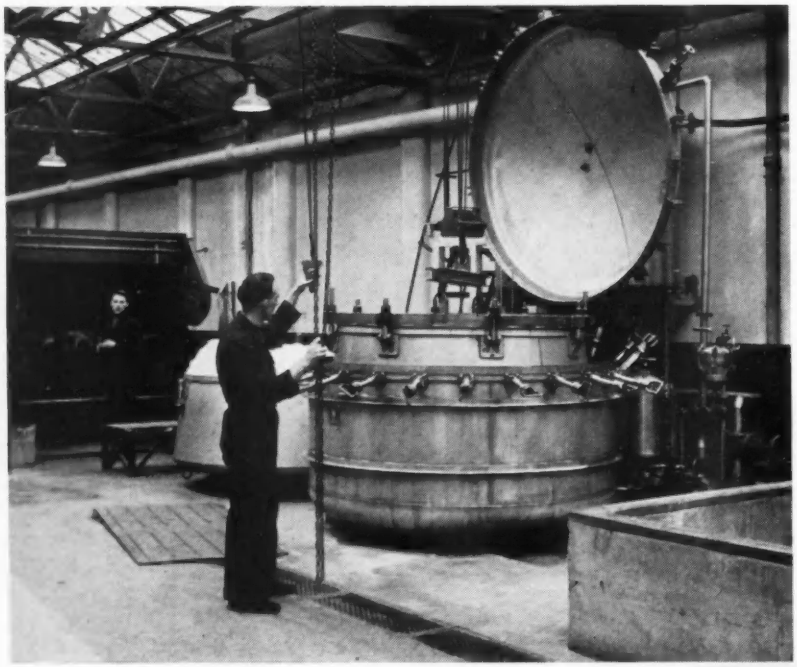

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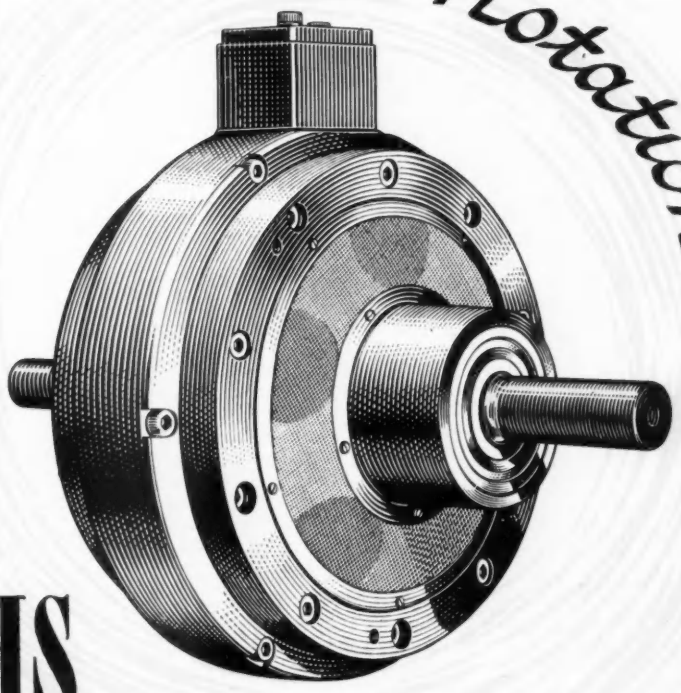

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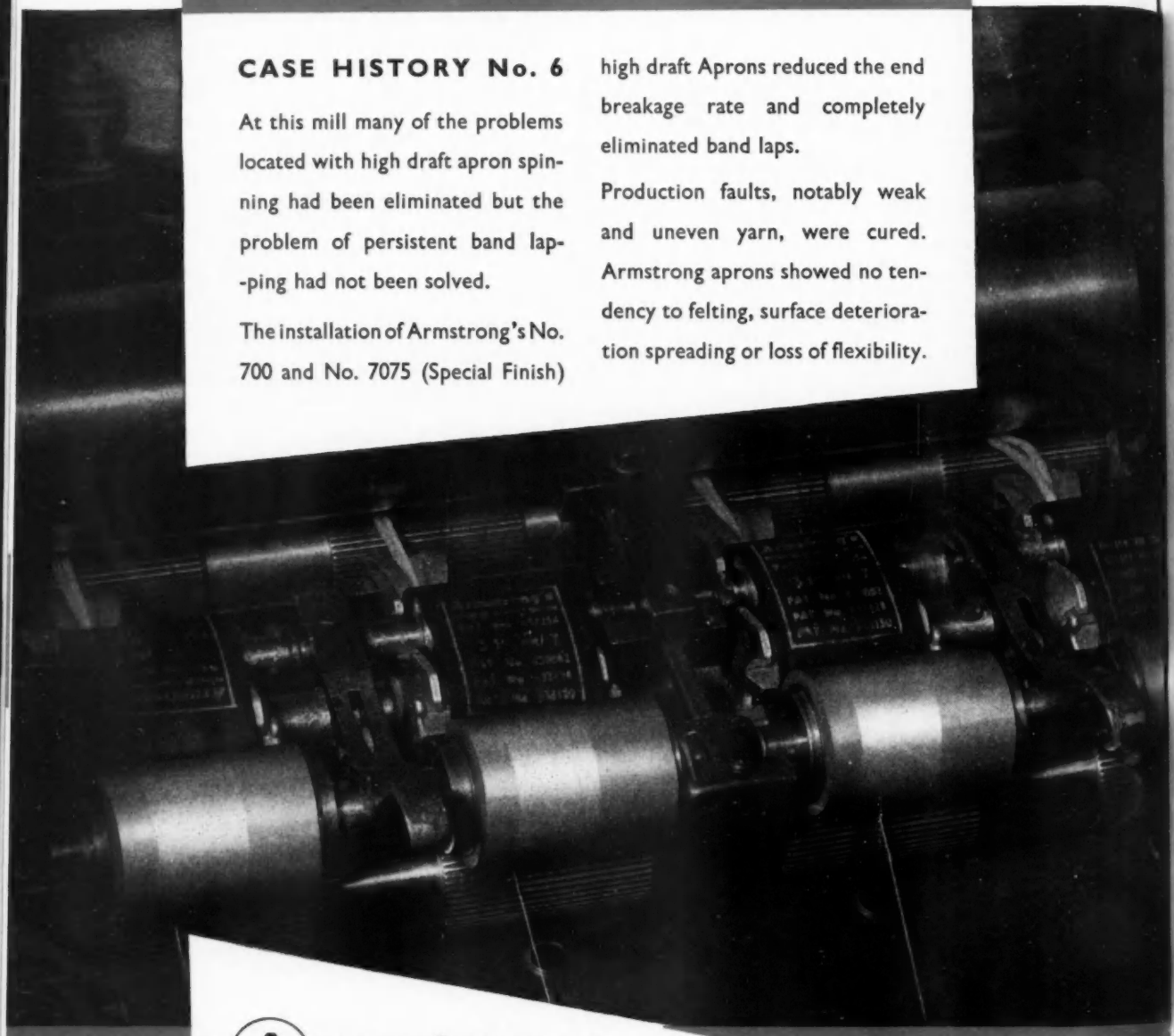

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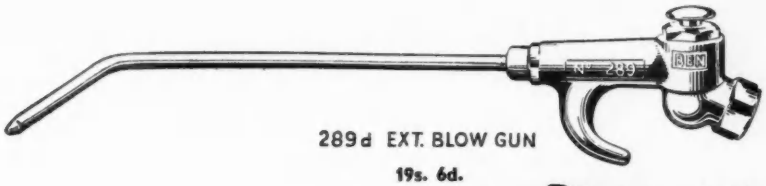

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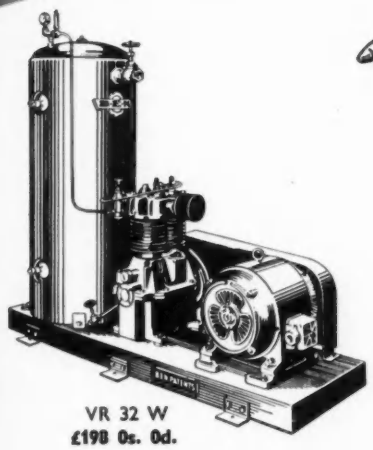

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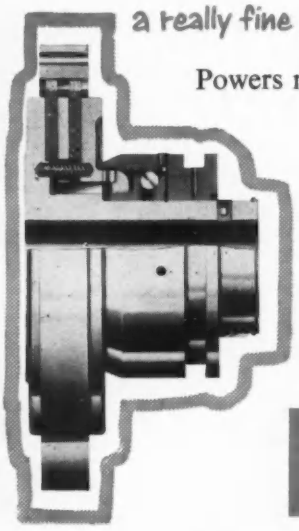

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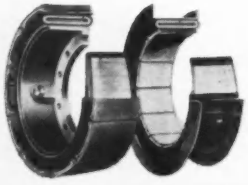
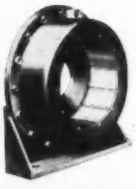


Air actuated Airflex clutch Publication 573



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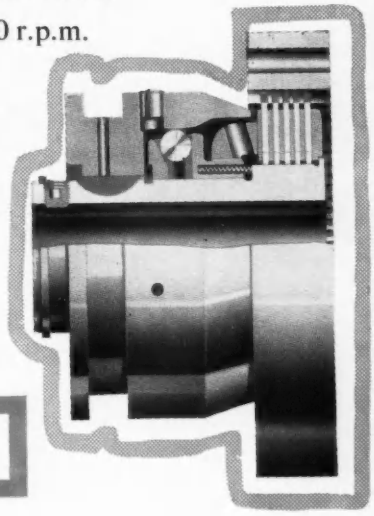

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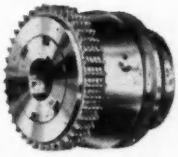
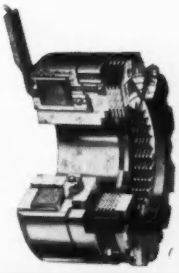


Magnetic Clutches and Brakes Publication 5756



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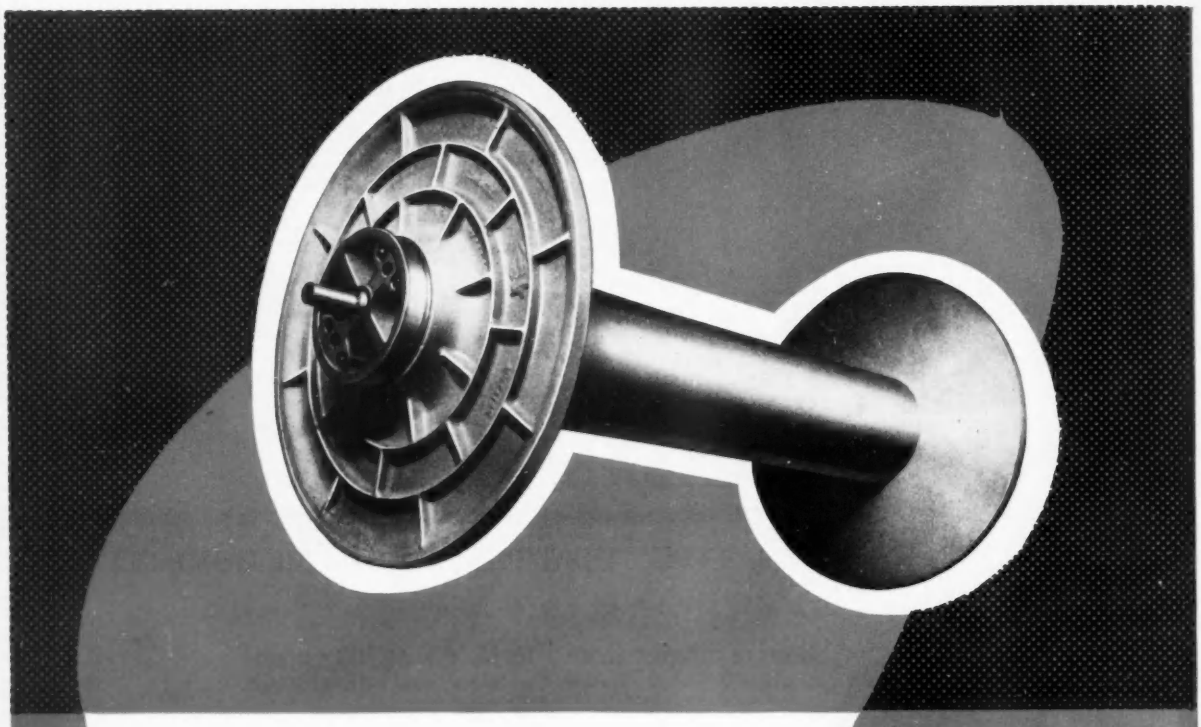

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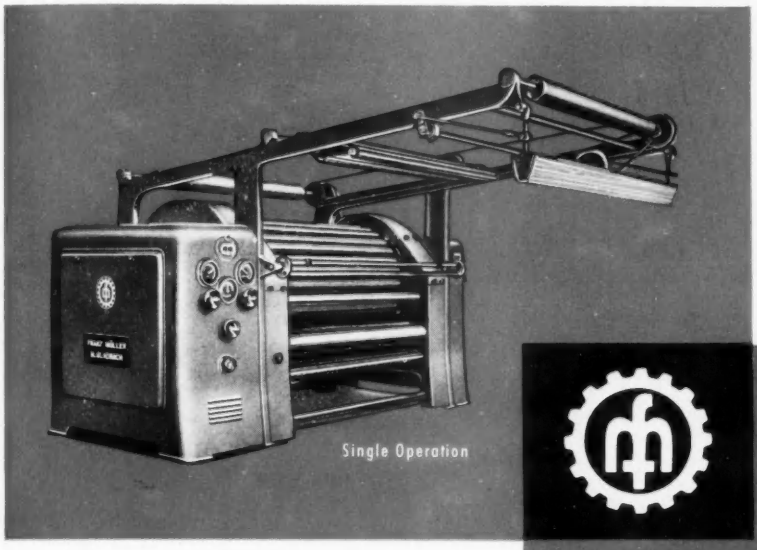

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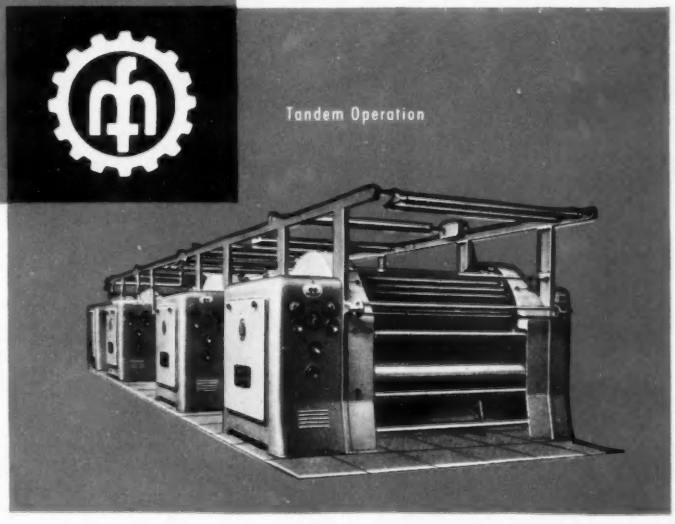

30 of these high speed raising machines replaced 80 standard machines in a North Carolina mill

for reasons of:

- **New Processing Methods**
- **Unequalled Finish**
- **Highest Production**
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thread guides

Recommended by "I.C.I." as the ideal material for processing **'TERYLENE'**

Ideally suited for EVERY KNOWN FIBRE.
'FARADEX' can be supplied in "CONDUCTING" or "NON-CONDUCTING" material in controlled matt or highly polished surfaces.

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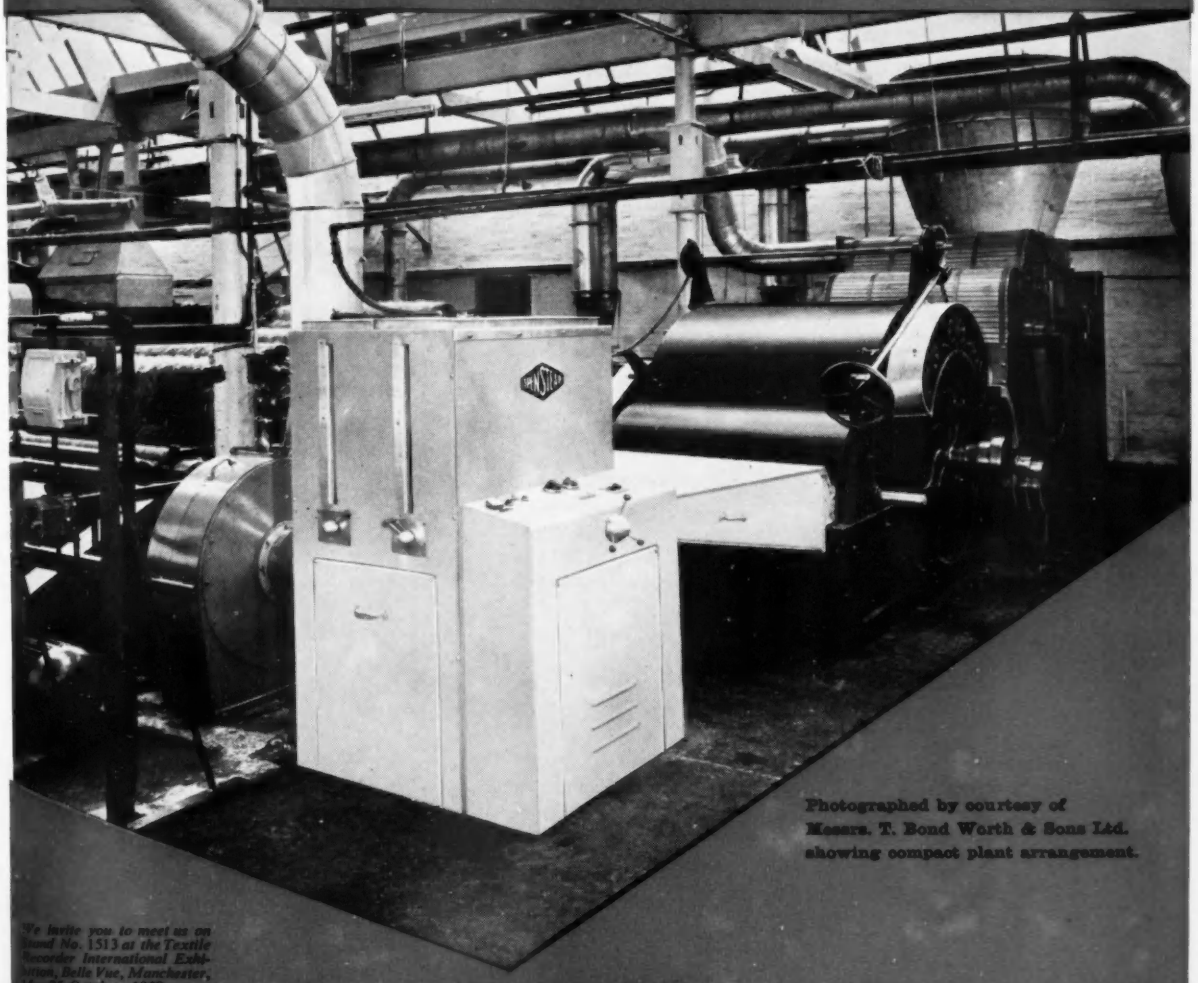
How do YOU oil Wool?

With this new Vortex Wool Oiler you just set the quantity control, "switch on" and the rest is automatic. Wool flow and oil flow are synchronised—No pumps—No compressed air—no jets to make up—no trouble. Only the new Vortex has all you ever hoped for.



Photographed by courtesy of Messrs. T. Bond Worth & Sons Ltd. showing compact plant arrangement.

We invite you to meet us on Stand No. 1513 at the Textile Recorder International Exhibition, Belle Vue, Manchester, 15—25 October, 1958

it's no trouble with SPENSTEAD NEW Vortex Wool Oilers

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AND COMPANY

Yarn Sales Division of English Sewing Cotton Company Limited

spinners, doublers

dyers and

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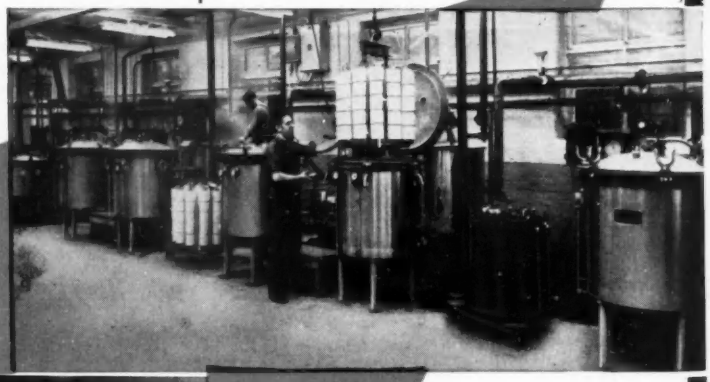
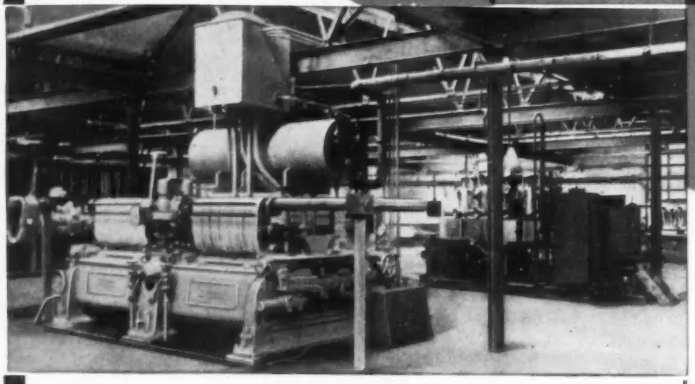
synthetic yarns





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How right he was. There's no place for rain (or water-borne stains) on a garment finished with I.C.I. Silicones. Without blocking the pores, I.C.I. Silicones completely repel water, but still allow the fabric to 'breathe'. More than that — they help a garment to keep its shape and improve the handle of the cloth. Today, so many fabrics owe their finishing touches to I.C.I. Silicones.

Proofed to Perfection with ICI Silicones

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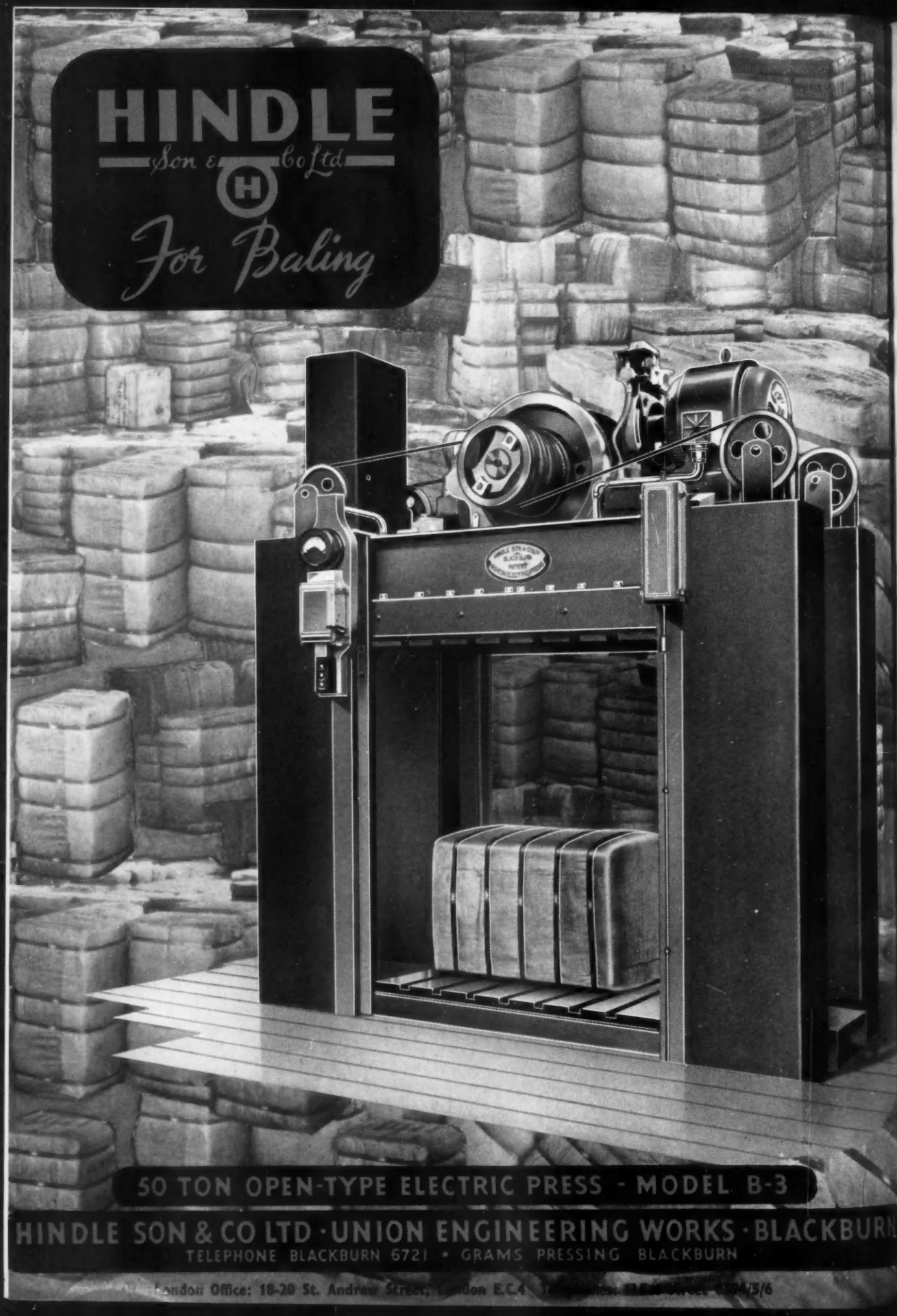
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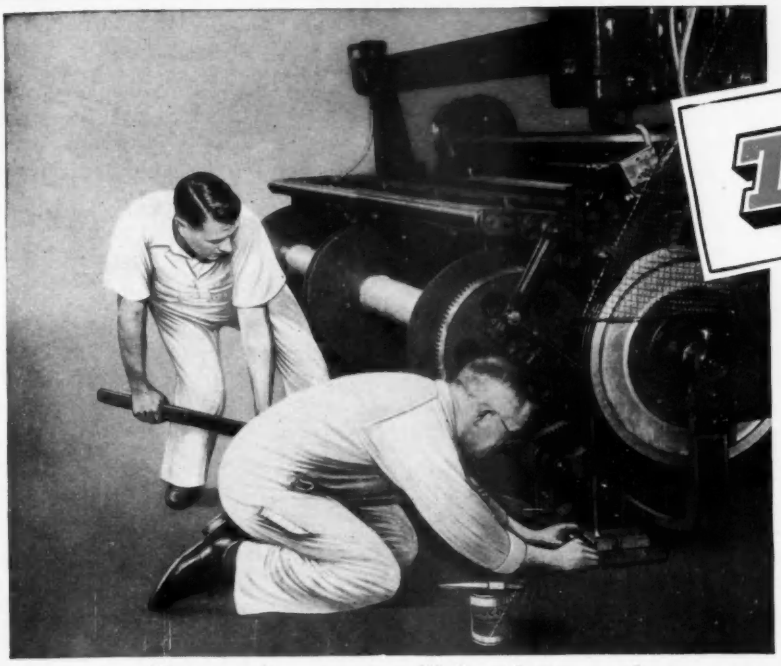


LET

TICO

PADS SOLVE THEM FOR YOU

NO BOLTS REQUIRED

EASY TO MOVE

IDEAL FOR UNEVEN SURFACES

Suitable for any type of floor

Your only regret will be that you have not used them before !

Shown above : Ultra-modern weaving shed where TICO Anti-vibration Pads are installed under every loom. (Photograph by courtesy of the British Rayon Research Association).

Close up 3-yard Loom mounted on block type TICO PADS.

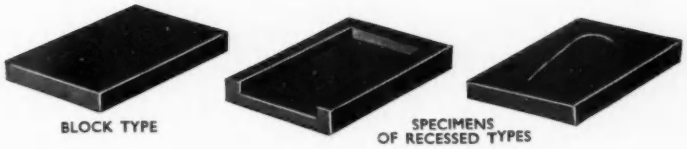
NO FUSS! NO BOTHER! NO BOLTS!

INSTALL TICO ANTI-VIBRATION PADS

FOR THE COTTON, WOOL, JUTE AND ALLIED SYNTHETIC FIBRE INDUSTRIES

TICO Anti-vibration Pads are obtainable in two standard types—BLOCK, and RECESSED, as illustrated. The BLOCK type is for normal installations, where machines are heavy and working speeds medium and low. The RECESSED types are for lighter-weight machines where higher-frequency vibrations occur.

- **TICO Pads reduce noise, disperse ground thump and thus reduce fatigue to both operator and machine.**
- **Considerable time and labour is saved when weaving sheds are being re-spaced.**
- **Simple and efficient in installation ; eliminate the need for holding-down bolts.**
- **On Ring Frame applications they counteract roller vibration and eliminate frequent re-setting.**



BLOCK TYPE

SPECIMENS OF RECESSED TYPES

COTTON INDUSTRY ENQUIRIES TO SOLE MANUFACTURERS TO :—

TEXTILE INDUSTRIAL COMPONENTS LTD.
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Phone : WYThenshawe 3458/9 Manchester Royal Exchange Pillar, G13

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TEXTILE INDUSTRIAL COMPONENTS LTD.
Tico Works, 21 Union Road, Low Moor, Bradford. Phone : Low Moor 565

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are exhibiting at

STAND NO.

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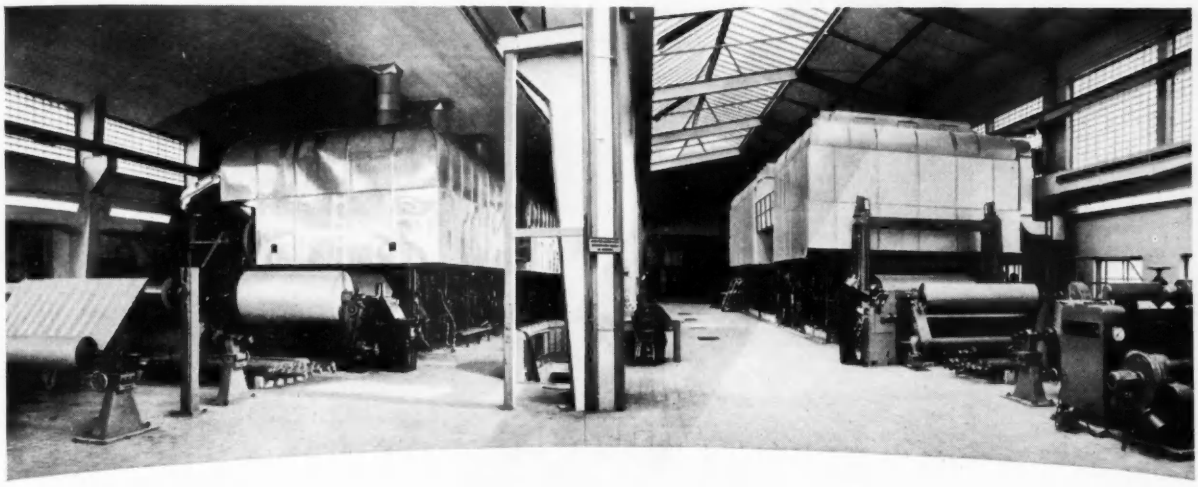
These huge paper machines ensure sufficient supplies of the basic material for our tubes, bobbins and pirns, in spite of the considerably increased production figures.



This gives you the assurance for the continuous, world-renowned reliability of our yarn carriers with regard to

STABILITY
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EMIL ADOLFF

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Ten lads on a slide at the Fair

Slid a mile with no trouser-seat wear

For in spite of such quick fun

(And consequent friction)

'twas Greylon protected them there!

GREYLON

GREYLON is an India Mills speciality yarn. This Nylon reinforced spun Rayon yarn is ideal for men's flannels, boys' trousers and all garments subject to rough wear. Highly resistant to abrasion and tearing, it has high fashion appeal and is available in all shades of marls, lovats, greys, and heather mixtures.

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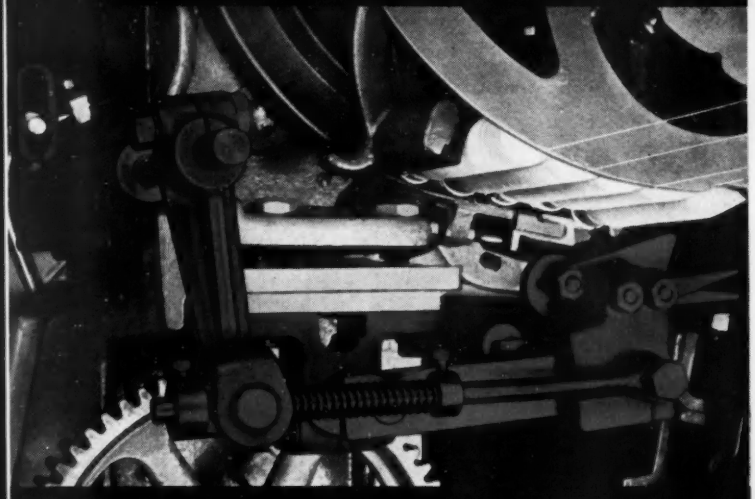
The Shuttle-Eye Cutter

Automatically woven cloth means better quality fabrics, but only if your pirn changers are equipped with a suitable shuttle-eye cutter.

The shuttle-eye cutter, model HR, is designed for +GF+ pirn changers of the semi-circular type but can also be fitted to pirn changers of other makes. Its design is amazingly simple and its construction very robust. Setting and maintenance present no problems whatsoever.

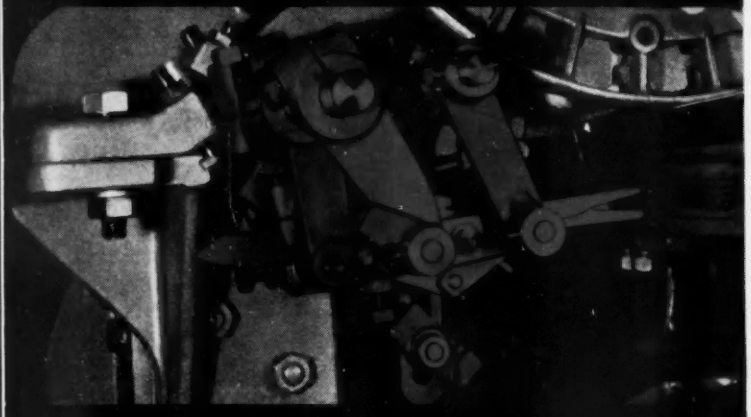


+GF+

Shuttle-eye cutter with thread holder for +GF+ pirn changer, model TM.

The scissors are mounted on two parallel levers. Their action, combined with the slotted construction of the cast steel shuttle box front wall, ensures that the weft is reliably caught, cut and removed from the shuttle box.

Please send for our leaflets and references.



George Fischer Limited, Schaffhausen, Switzerland

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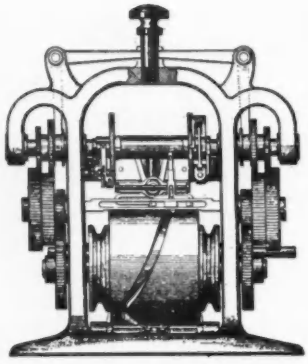
Messrs. Barke Machinery, 100 Portland Street, Ashton-under-Lyne.

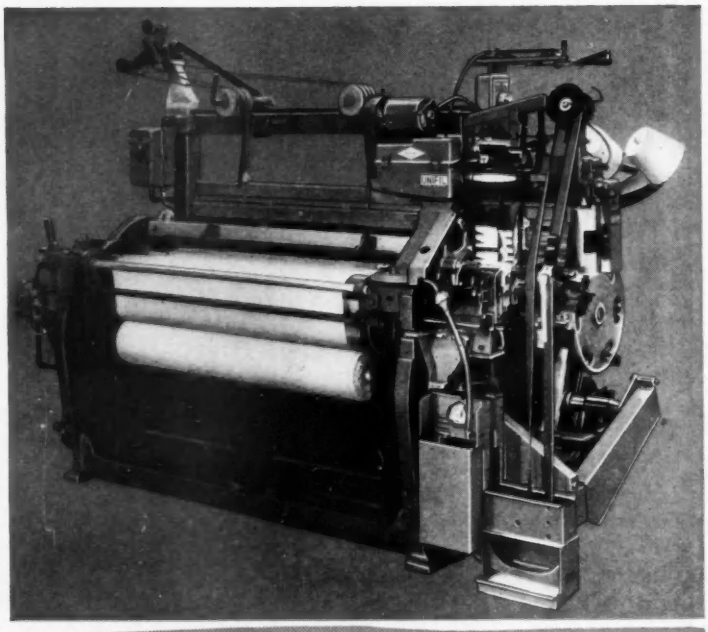
We are exhibiting at the Belle Vue Exhibition, Manchester, 15—25 October, 1958



The Original
Precision Winding Machine

ORIGINATORS IN 1891

STILL LEADING IN 1958



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LOOM WINDER

A new conception of weft preparation for automatic loom weaving

UNIVERSAL WINDING COMPANY

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MANCHESTER 1. Tel. ARD. 4304

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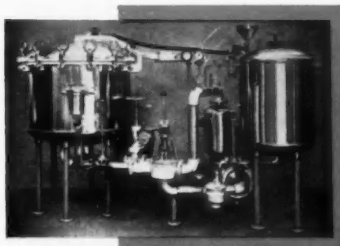
PEGG

PRESSURE DYEING MACHINES

A complete range of machines for dyeing all types of fibre in every stage of manufacture, including loose, top, beam, hank and package forms. Also rapid package drying machines.

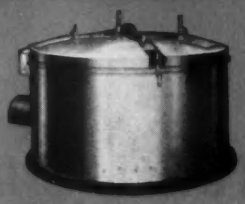


HANK DYEING MACHINES

Built in stainless steel in capacities ranging from 25 to 1500 lbs. for all classes of wool, worsted, mixture and linen yarns in hank form. Machines may be coupled together.

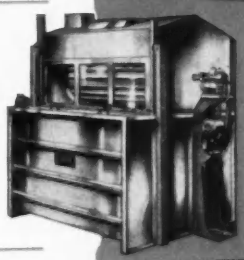
LOOSE STOCK DYEING MACHINES

For all classes of loose stock, rags and synthetic fibres, in 3 capacities of 10–50 lbs., 100–250 lbs. and 200–600 lbs. Stainless steel construction.



PIECE GOODS DYEING MACHINES

A comprehensive range of machines available in stainless steel for dyeing all types of woollen or worsted piece goods, silk or rayon fabrics and knitted fabrics in rope form. Also carpet dyeing machines.

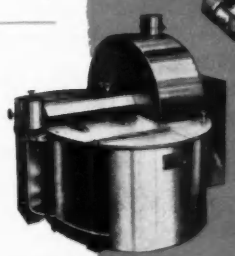


ROTARY DYEING MACHINES

Totally enclosed rotating drum machine for dyeing nylon, pure silk, rayon and cotton hose with perfect penetration and uniformity. Stainless steel in 25, 50, 100, and 200 lbs. capacities.

PADDLE DYEING MACHINES

A versatile machine, in stainless steel, for ladies' hose, half hose, and loose articles. Also used for anti-shrink and bleaching. 4 capacities from 12–200 lbs.



DYEING AND FINISHING MACHINES

Builders of dyeing machines for loose stock, hanks, packages, piece-goods, fabric and hose; also finishing machines for all classes of circular knitted and warp loom fabrics and garments. Pre-boarding and finishing machines for nylon hose.

A Member of the Bentley Group

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COTTON

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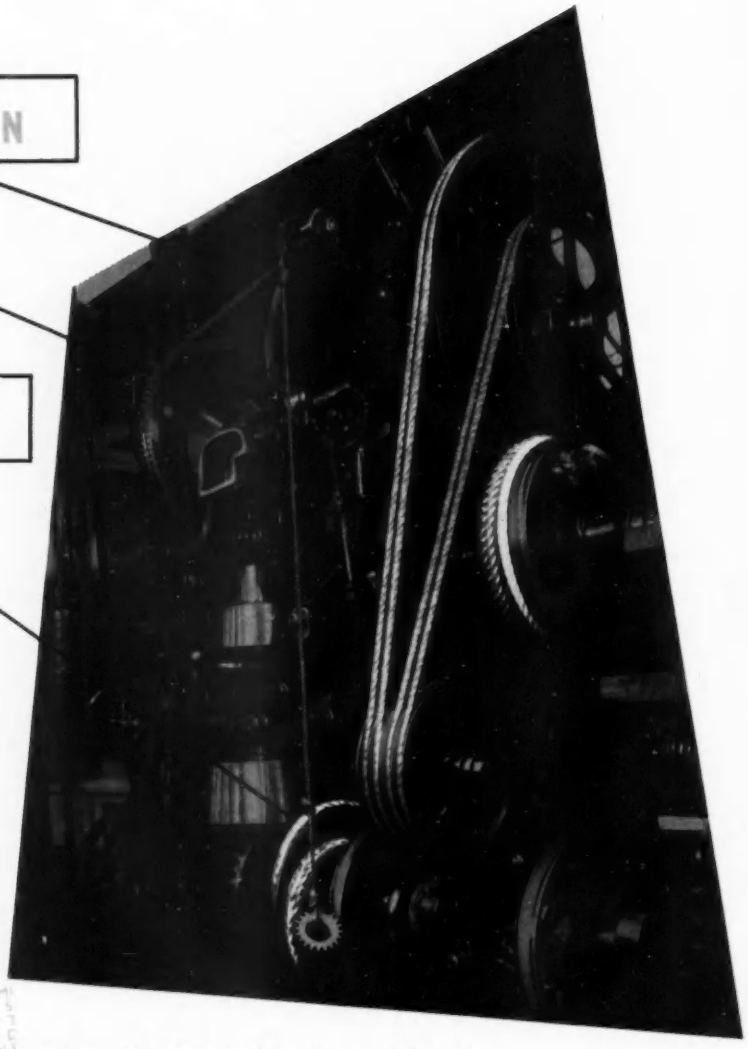

Textile Ropes in Cotton Nylon or Terylene

With the introduction of synthetic fibres, such as Nylon and Terylene, textile ropes can now be made which have a much longer working life than hitherto.

Ropes which have to take more strain than others, such as rim and draw bands, can be strengthened with Nylon or Terylene yarn, and so avoid the disruption caused by too frequent rope breaking.

The spinning mule shown above, photographed in a Yorkshire woollen mill, has a Cotton down band, rim and draw bands of Nylon, and scroll bands made of Cotton blended with Nylon.

Are you using the best type of rope on your textile machines? If in doubt, ask for our representative to call, or write for our technical advice, which will be given without obligation.

Kirkstall Brand Ropes by LEDRAY

SAMUEL LEDRAY AND SONS · ST. ANN'S MILLS · KIRKSTALL · LEEDS 5 · ENGLAND

UNBRAKO

WORLD'S FINEST COMPLETE SPECIALISED SCREW SERVICE

You never notice a screw when it does its job.

When it doesn't, you wish you'd specified Unbrako.

Make no mistake, you *can* always specify Unbrako.

There is a huge standard range to choose from, but if you need something really unusual, Unbrako will work to your specification or design a special screw in B.A., B.S.W., B.S.F., metric and unified.

Unbrako technicians are fastener-minded. What's more, they are enthusiastic and helpful people, men who really know their job. They make the best screw that money can buy — a screw you can fit and forget. Details of sizes and threads will gladly be supplied on request.

UNBRAKO SOCKET SCREW CO. LTD., COVENTRY, ENGLAND

Flexible Joints indeed...

A fight between two mustang stallions was quite a common sight on the American plains where wild horses roamed in their thousands in the late 18th and the 19th century.

1958 TEXTILE RECORDER
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Of course, in the 20th century, when engineers want flexibility in the horse-power under their control they instinctively think of the hall-mark "SILENTBLOC" for

FLEXIBLE COUPLINGS, FLEXIBLE BEARINGS & ANTI-VIBRATION MOUNTINGS.

Collected over many years, there is a wealth of technical information at your disposal. When a project is on the drawing-board our technicians can be of most help to you . . .

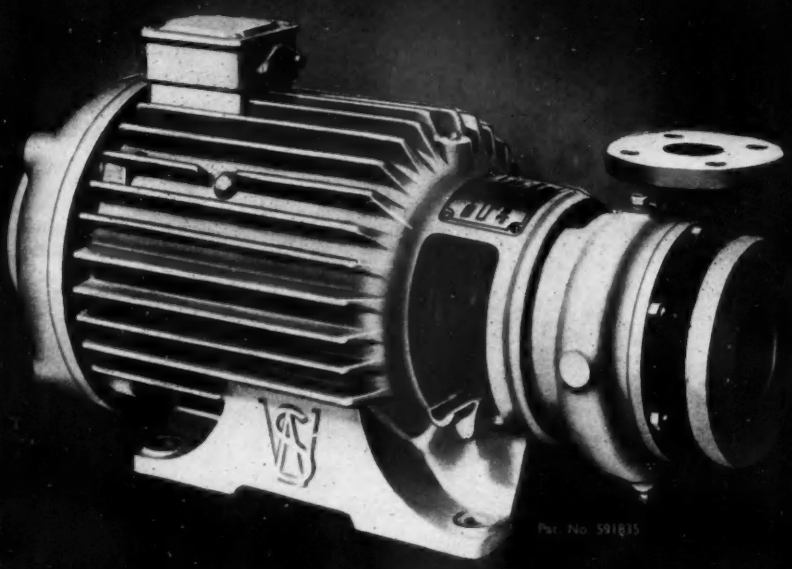
COME TO US AT THE DRAWING-BOARD STAGE

SILENTBLOC
REGISTERED TRADE MARK

SILENTBLOC LTD., MANOR ROYAL, CRAWLEY, SUSSEX, Telephone: CRAWLEY 2100.
Subsidiary—The Andre Rubber Co. Ltd.

NEW chemical resistance

Worthington-Simpson pumps in WORTHITE, superior alloy steel, offer full corrosion resistance to sulphuric and many other acids and alkalis. For pumping mildly corrosive liquids, 18/8/3 Stainless Steel is specially suitable and it will not contaminate or discolour non-corrosive liquids. This range of pumps is of cost-saving Monobloc construction, and the pumps themselves have interchangeable stuffing box glands and mechanical seals to permit simple changes to suit different processes.



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MONOBLOC

CHEMICAL PUMPS

in WORTHITE and 18/8/3 STAINLESS STEEL

Here are just a few of the many liquids which these pumps will handle effectively and safely

Sulphuric Acid
Acetic Acid, glacial
Acetic Anhydride
Acetone
Alcohols
Benzoic Acid
Boric Acid, cold
Butyric Acid
Calcium Bisulphite
Caustic Potash, 70°F
Caustic Soda up to 50%
Chlorosulphonic Acid, 120°F (pure)
Chloroform
Copper Sulphate
Ethyl Acetate, 70°F
Fatty Acids
Formaldehyde, 70°F
Glycerine
Magnesium Sulphate, 5%, 70°F
Nitric Acid, all concentrations
Oleum, up to 120°F
Phosphoric Acid, 10%, 70°F
Phosphoric Acid, 85%, 70°F
Refinery Crudes
Silver Nitrate, 70°F
Sodium Sulphate, 5%, 70°F
Sodium Sulphide, 5%, 70°F
Sodium Sulphite, 5%, 70°F
Sulphurous Acid

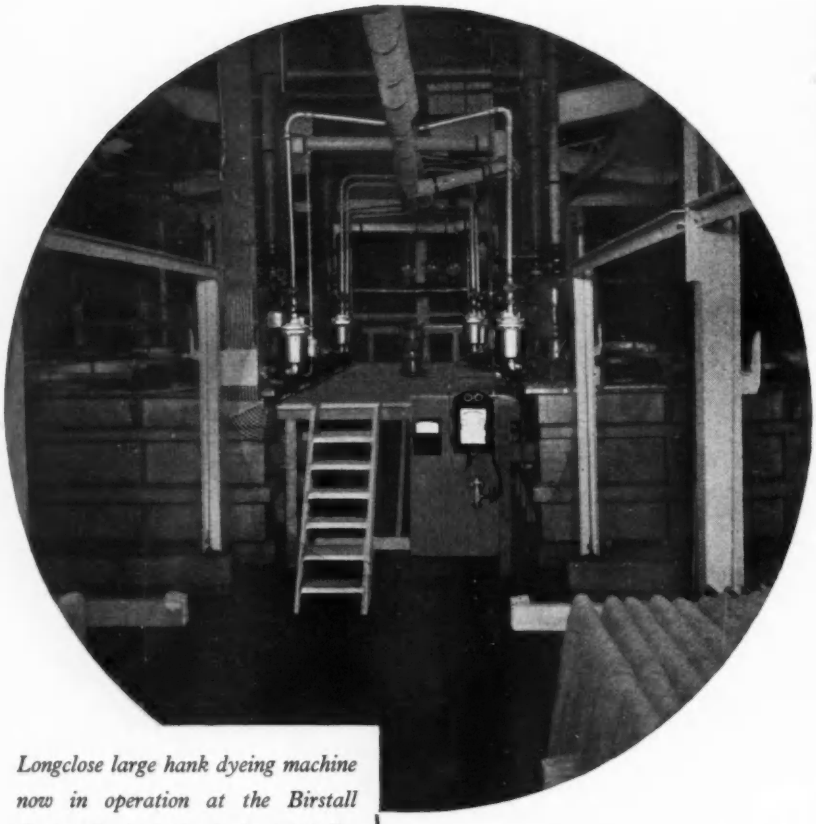
Worthington - Simpson LTD NEWARK NOTTS

put it to the test

write for WORTHITE & 18/8/3 1" Specimen Discs and test them under your own site conditions

P659

CALL IN DRAYTON*



Longclose large hank dyeing machine now in operation at the Birstall Carpet Co. Ltd., for dyeing 9,000 lbs. of yarn at a time. 12,500 gallons of liquor are withdrawn, mixed and interchanged between four tanks and temperature control is a critical feature. Any slight difference in the rate of temperature rise between the tanks would cause lack of uniformity of shade. The machine is fully automatic: the temperature of the four vats is controlled by a Drayton D.V. 3 Dye Vat Control.

DRAYTON dye vat controls, for all types of dyeing machines, are completely automatic, absolutely dependable and do not call for skilled operators. They maintain a continuous degree of accuracy unobtainable by manual control. They reduce working costs and ensure improved and uniform production. For full information write for the booklet "The Application of Automatic Control to the Dyeing Process."

Air operated controllers with or without recording feature.

Air or water operated controllers; expansion stem type.

On-off electric control. Available with a wide range of thermostatic switches.

Self-operated controllers, for calorifiers, tanks, etc.

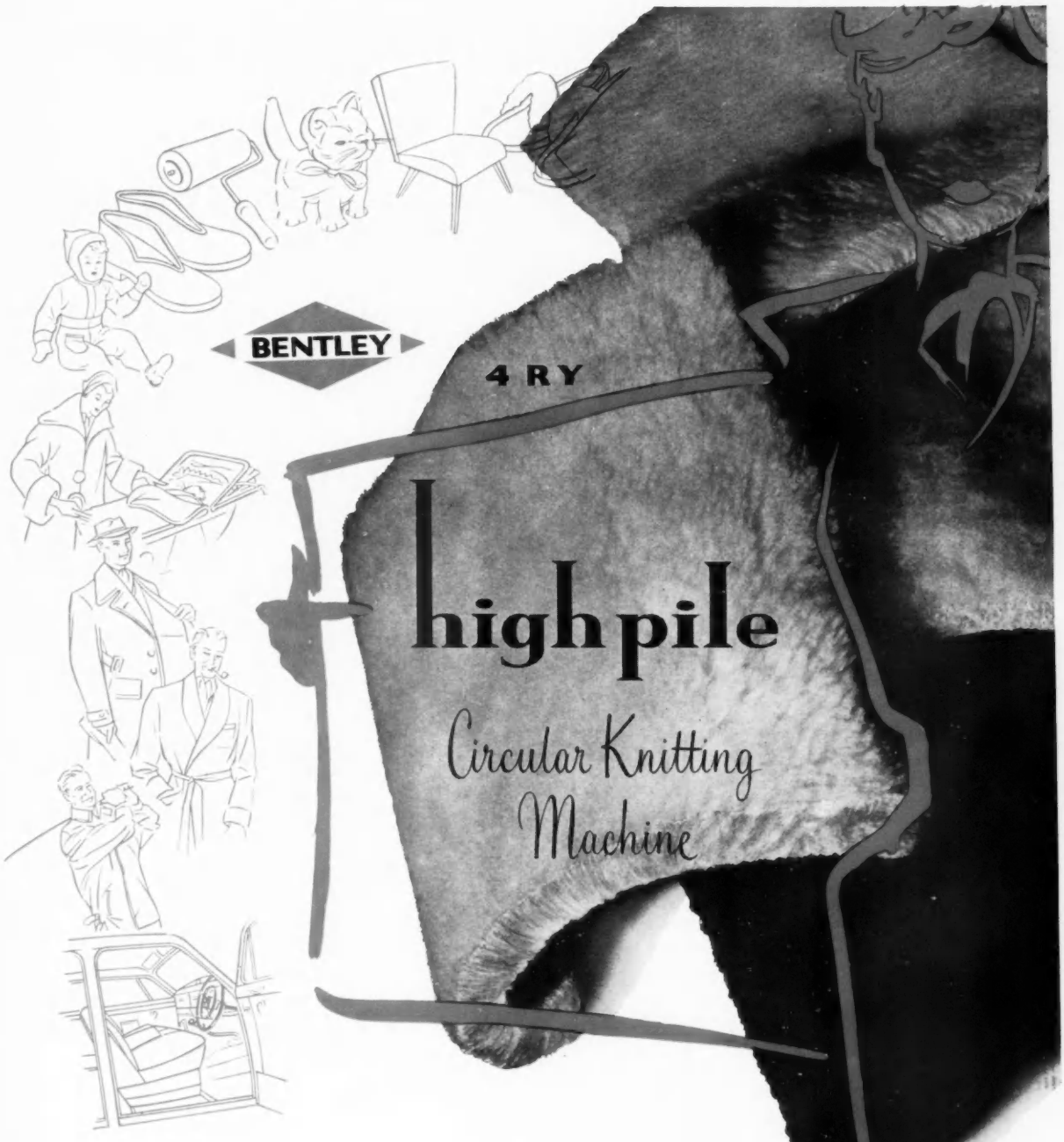
Proportioning electric control with electrical or capillary tube transmission.

*and get things under control

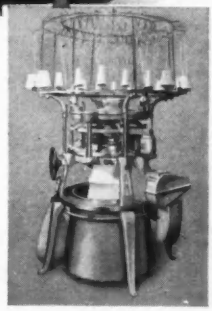
A.C.29T.

Write to Dept. T.M.

The Drayton Regulator & Instrument Co. Ltd., West Drayton, Middlesex. *Tel.: West Drayton 4012*



The new Mellor Bromley 4 R Y machine in 24" diameter and with eight knitting feeders, produces approximately 11 yards of high pile fabric per hour and requires only one operator for four machines. By the use of appropriate natural or man-made yarns or combinations of both, a wide range of fabric qualities and finished effects can be obtained, suitable for a wealth of applications.



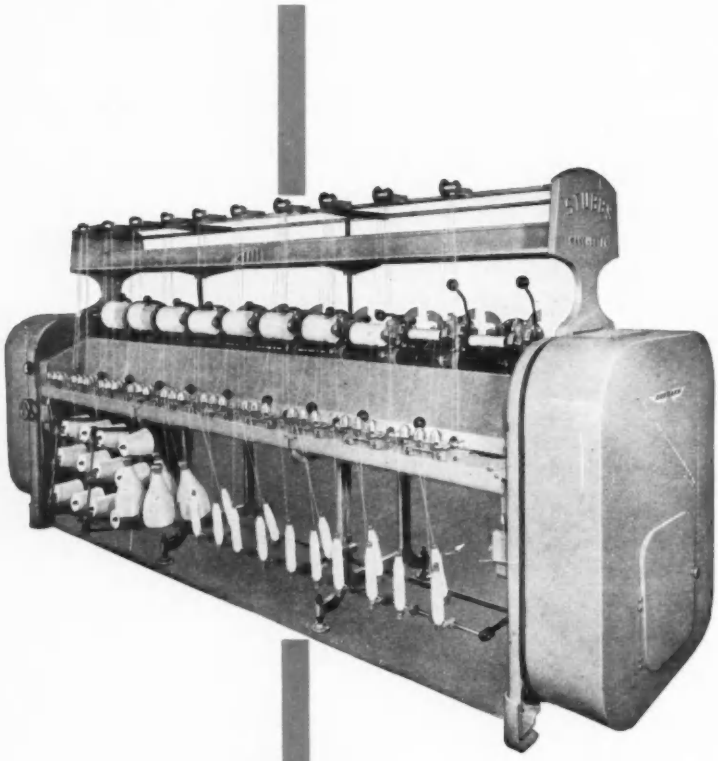
MB 37

Built within the Bentley Group by :
MELLOR BROMLEY & CO. LTD., ST. SAVIOURS ROAD, LEICESTER *Telephone* : 38161 *Telegrams* : AUTOMATIC, LEICESTER TELEX.

STUBBS DUBRAKE

MULTI-END CHEESE WINDER

(PATENT APPLIED FOR)



Perfect packages are wound at exceptionally high speeds and the Machine is most simple to operate and gives trouble-free running, thus keeping maintenance costs at an absolute minimum.

Instantaneous Stop Motion operates upon breakage or termination of a thread.

The dust extraction unit is fitted as an extra. Dust and fluff created during winding effectively drawn and carried to a collecting canister at the off end of the Machine.

Standard Machine supplied with direct 'V' Rope Drive from Motor to Driving Shaft.

If desired, a variable Speed Drive can be supplied with tachometers and hand wheel adjuster.

1958 TEXTILE RECORDER International TEXTILE MACHINERY AND ACCESSORIES exhibition BELLE VUE MANCHESTER 15-25 OCTOBER 1958

STAND 1511

Winding Speeds up to 800 Yards Per Minute

Makers of Machinery for WINDING, DOUBLING, CLEARING, GASSING, REELING, PREPARING, POLISHING and BUNDLING all classes of Yarns and Threads.

Telephone: COLLYHURST 1721 (3 lines) Telegrams: WINDING, MANCHESTER

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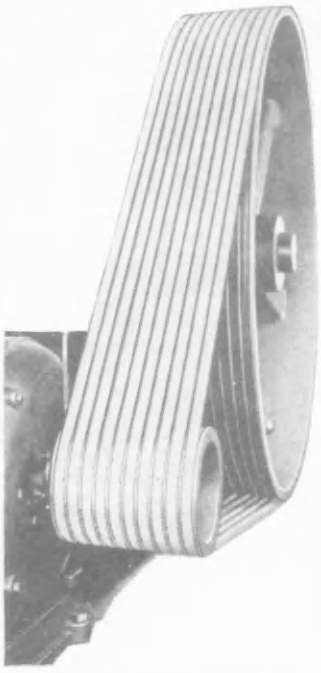

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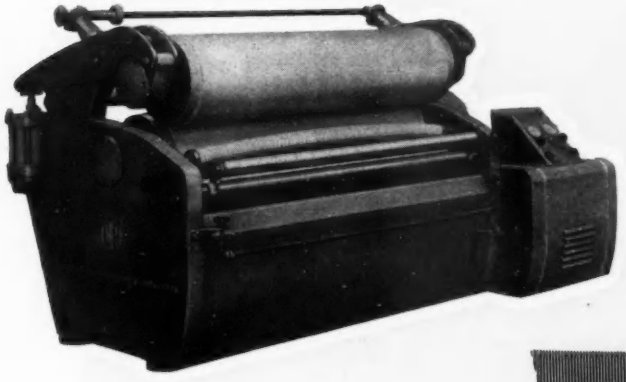
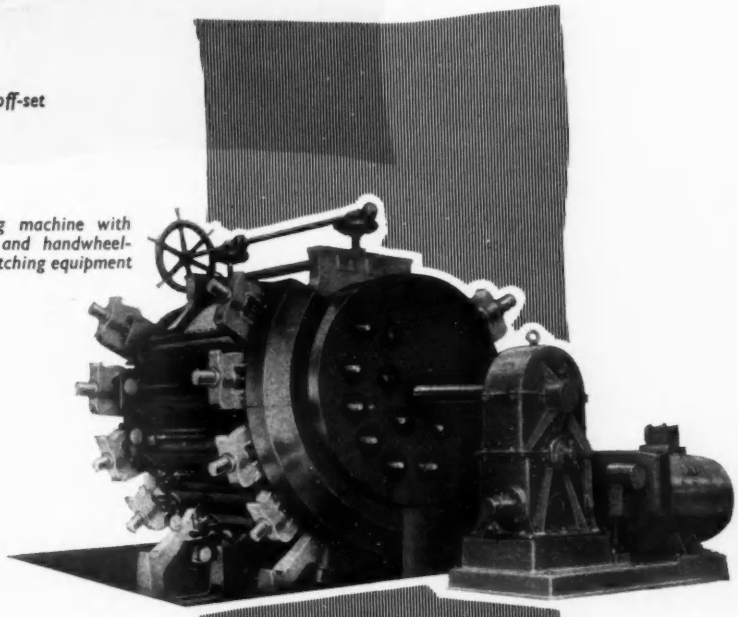


Two-bowl pneumatic off-set padding mangle

Ten-colour printing machine with hydraulic loading and handwheel-operated pattern pitching equipment



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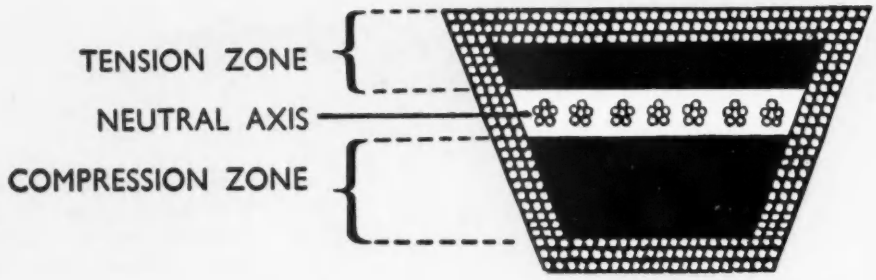

IN THEORY

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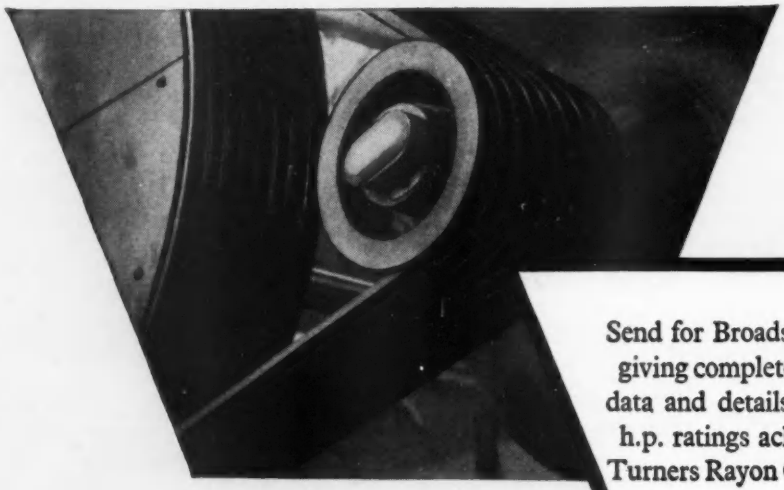

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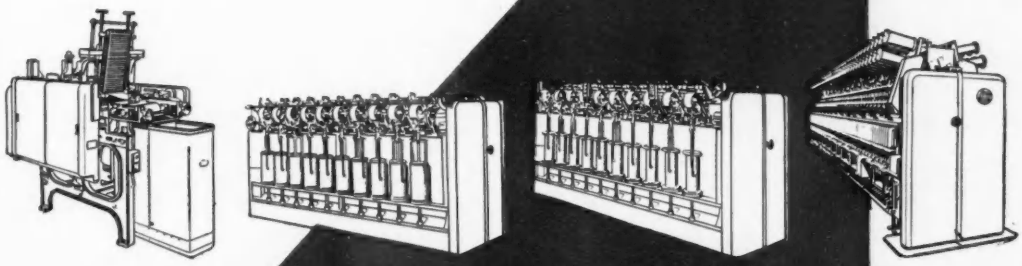

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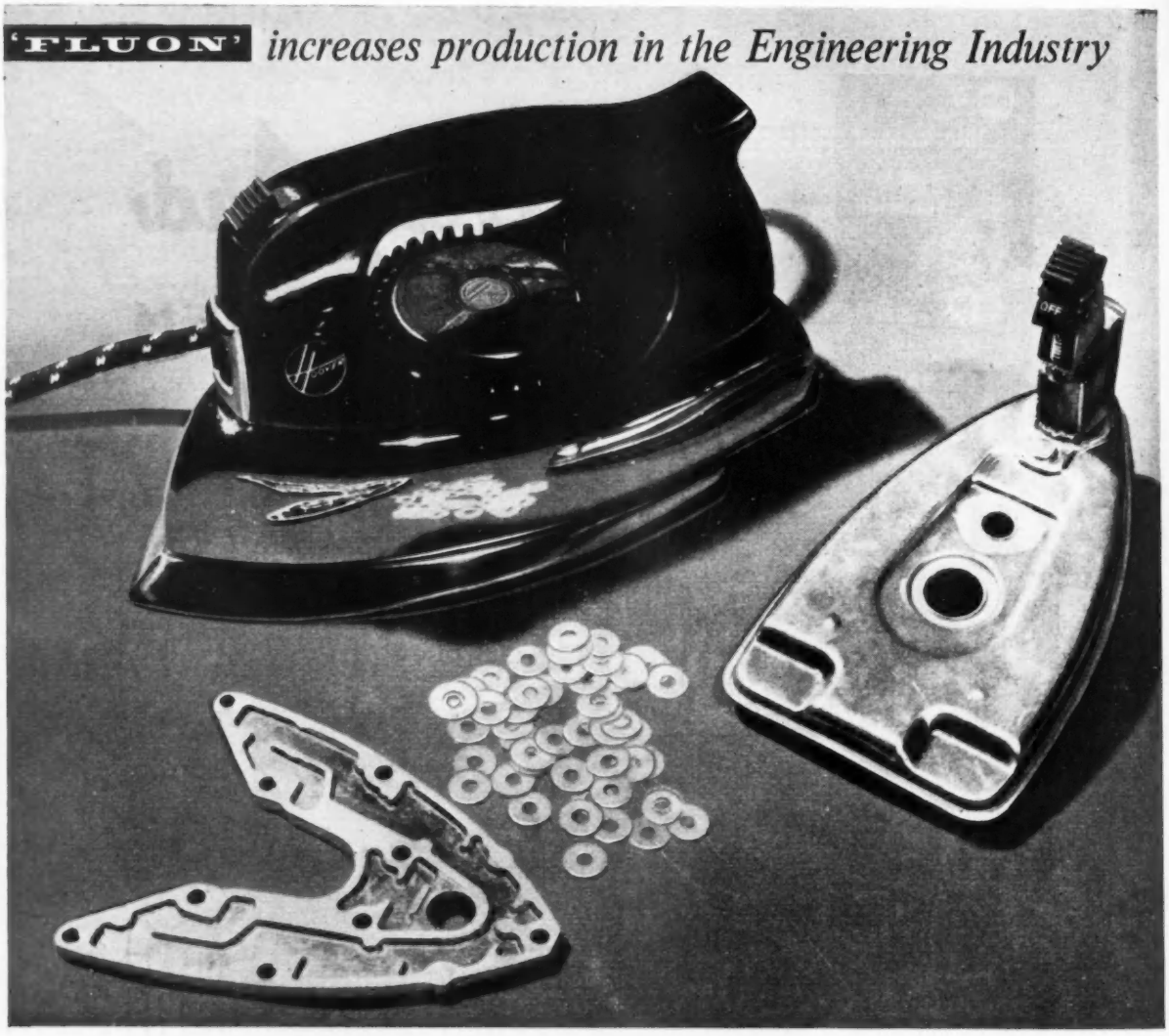

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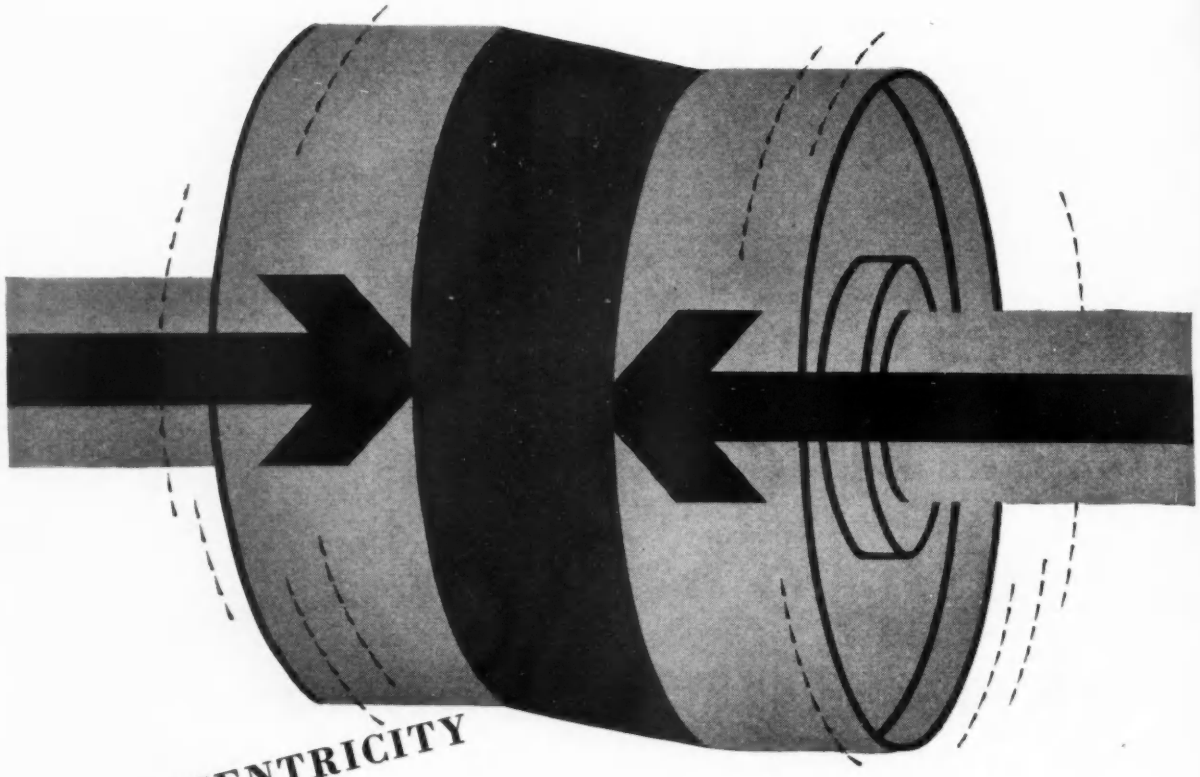

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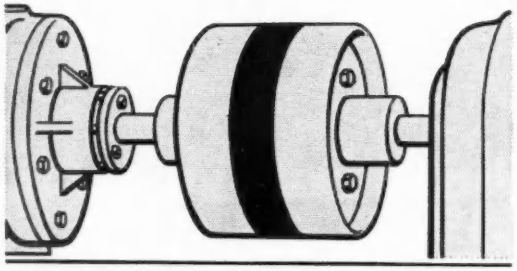

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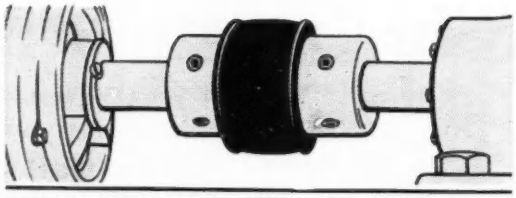

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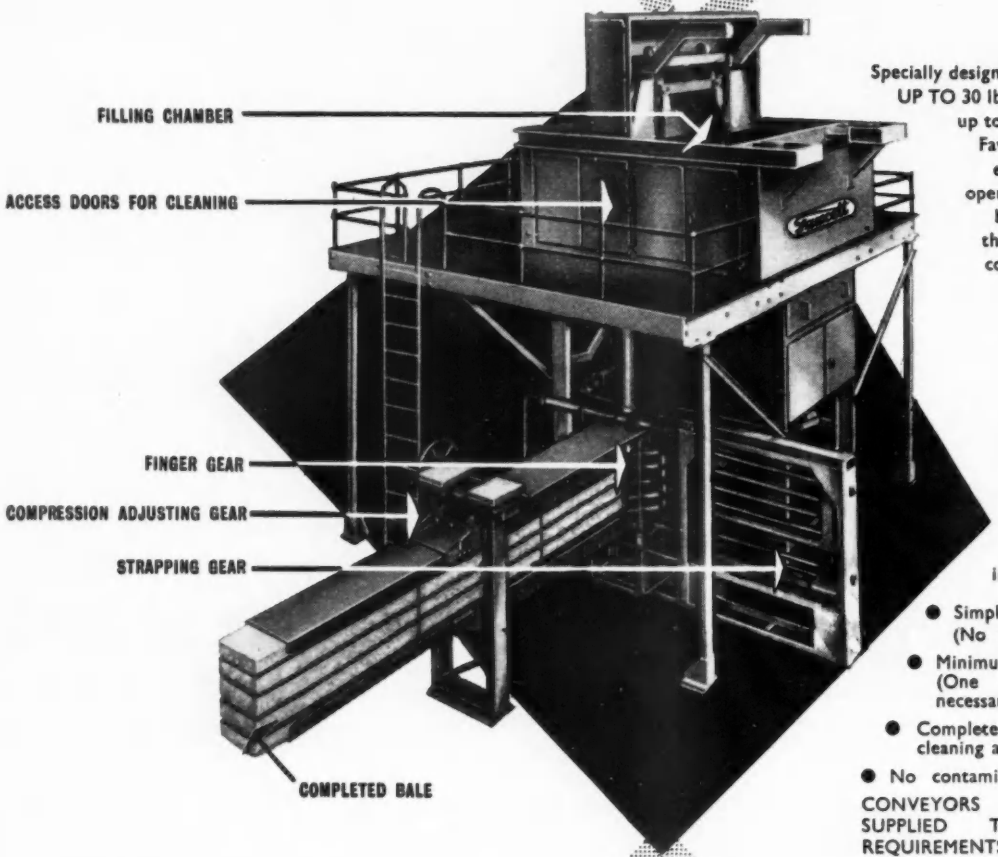

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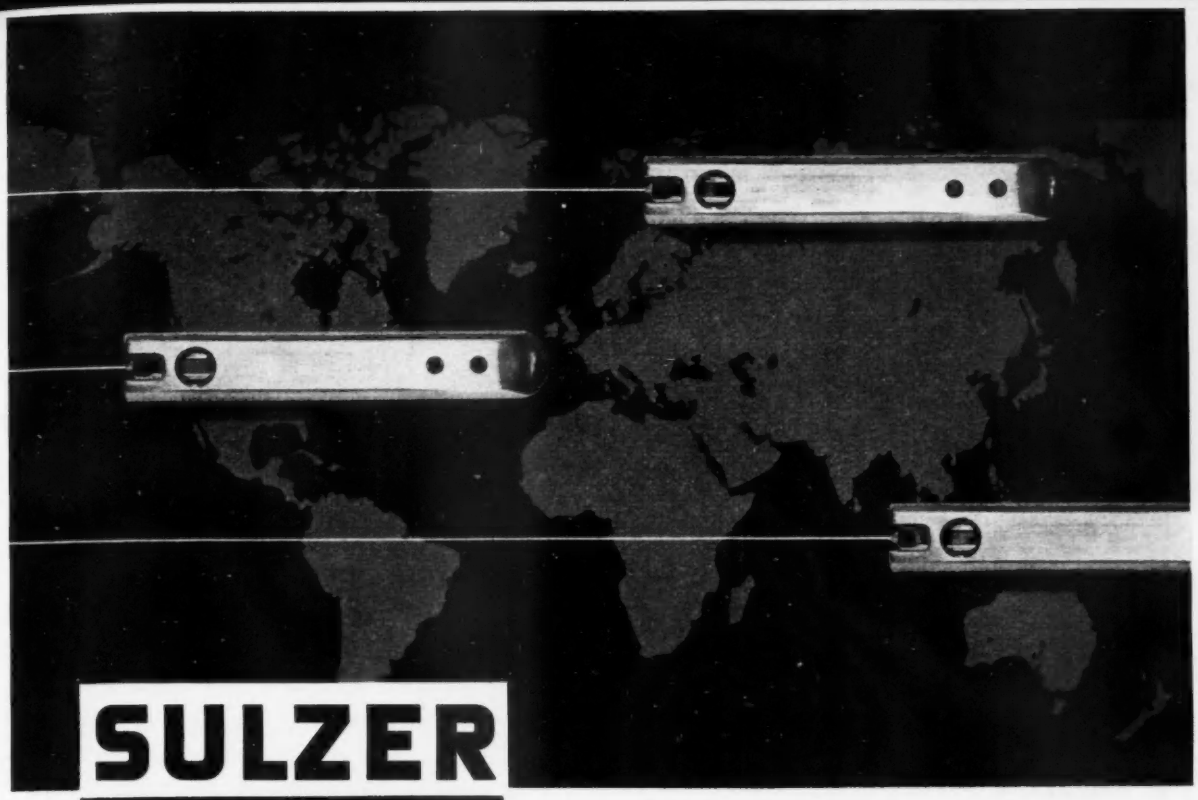

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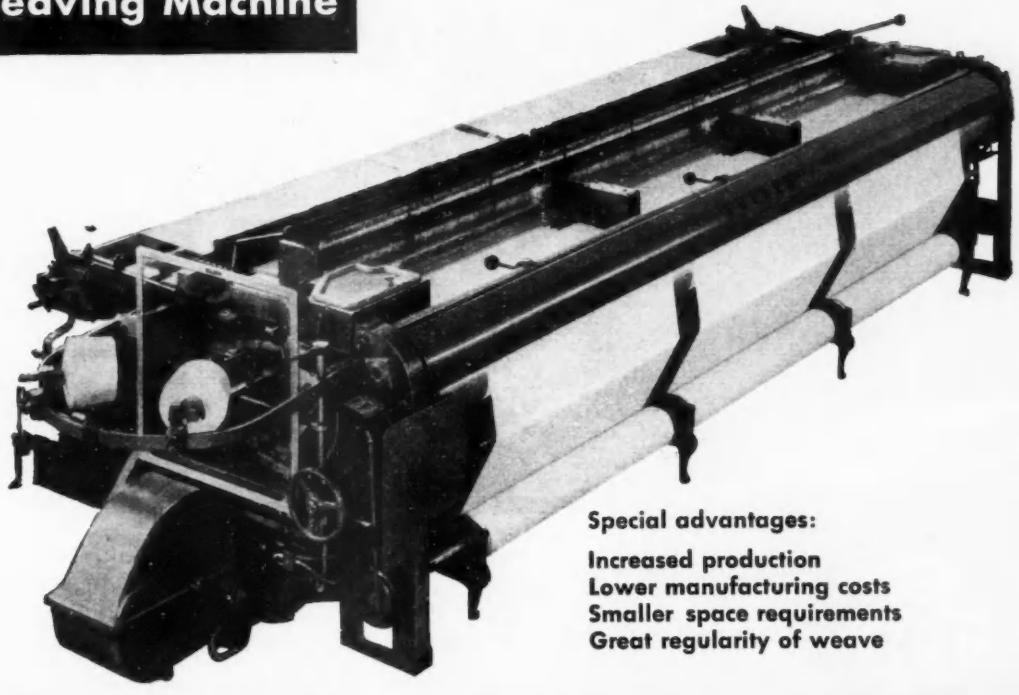

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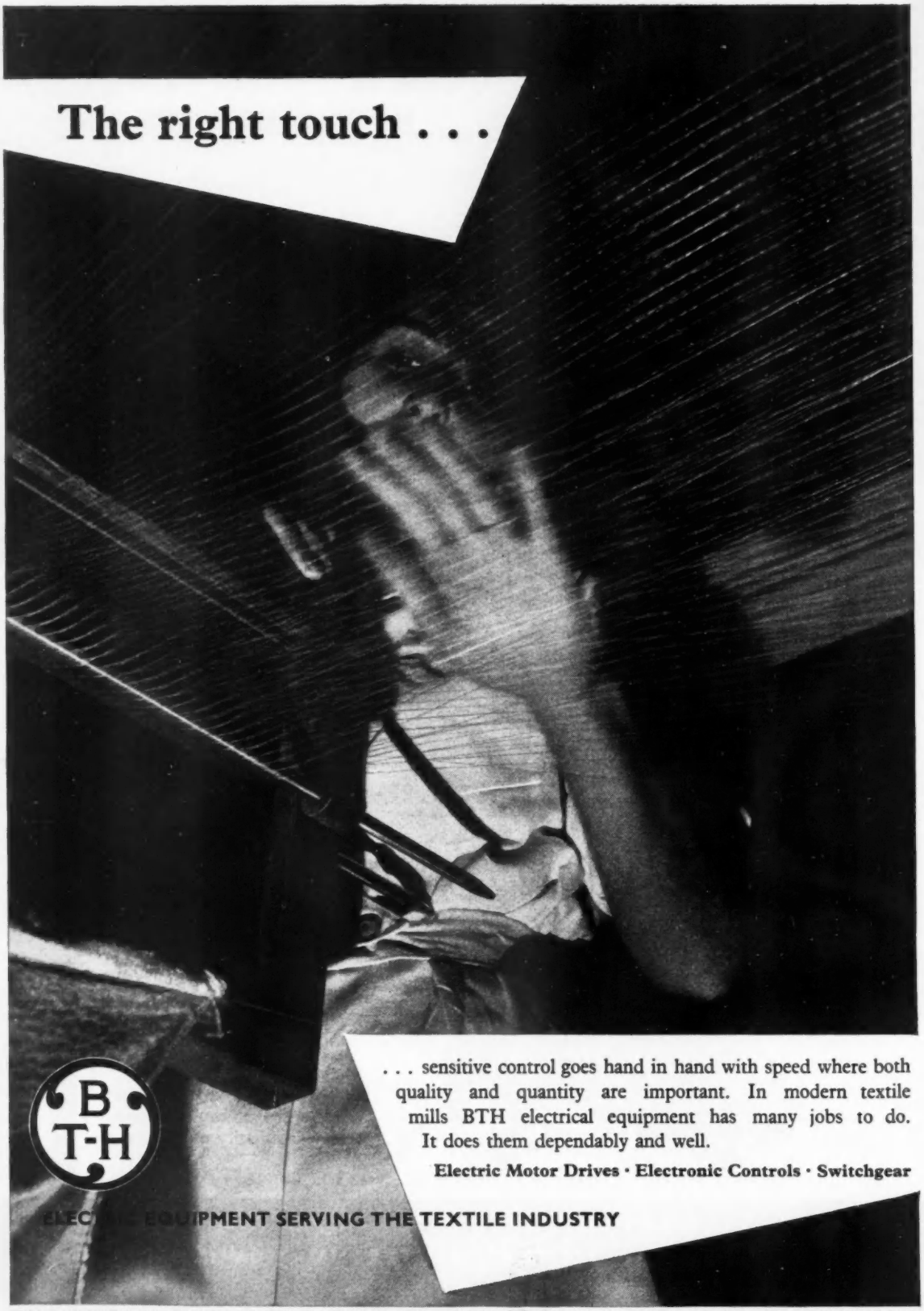

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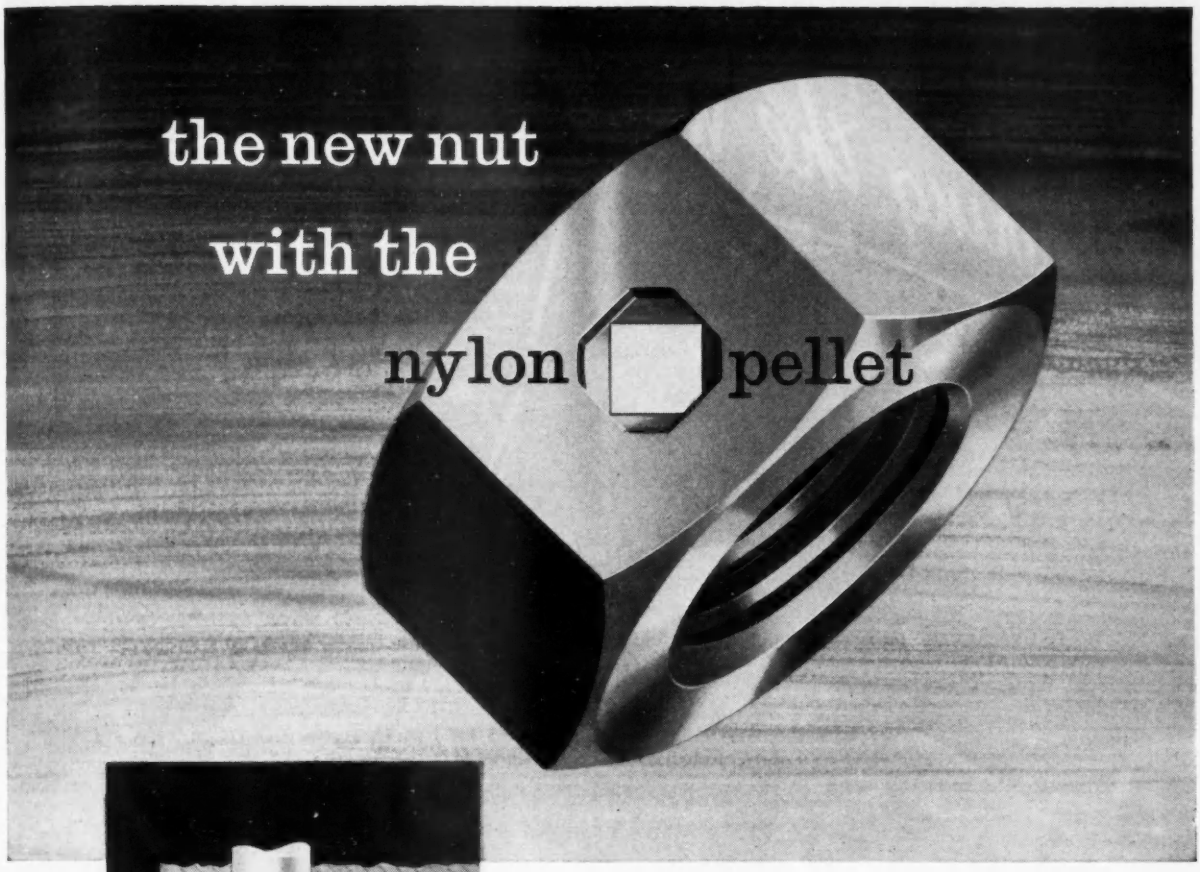

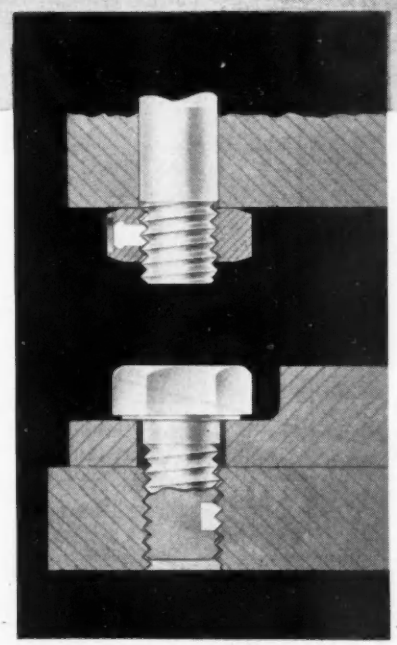

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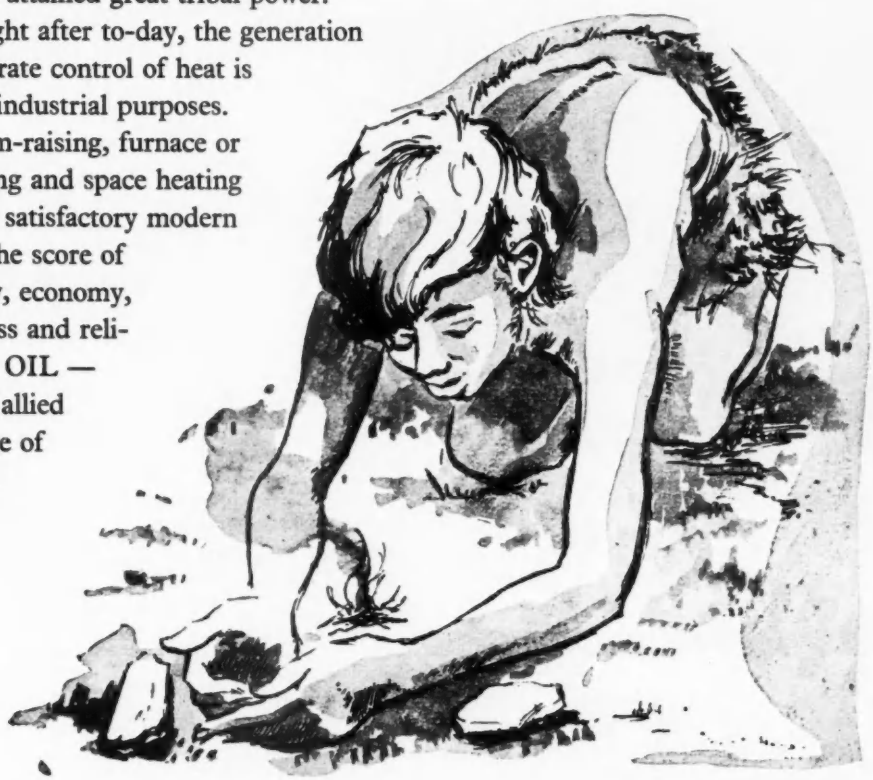

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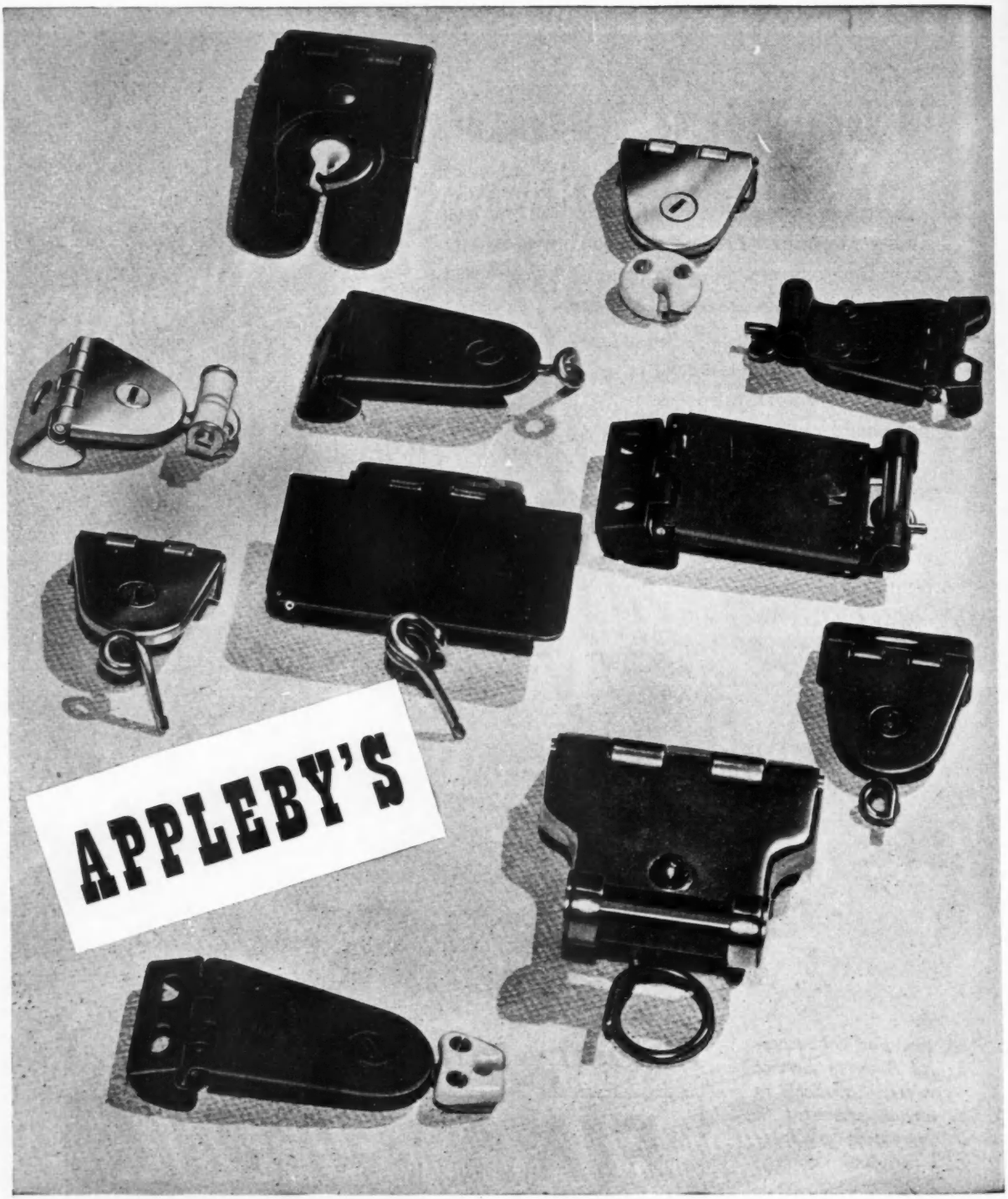

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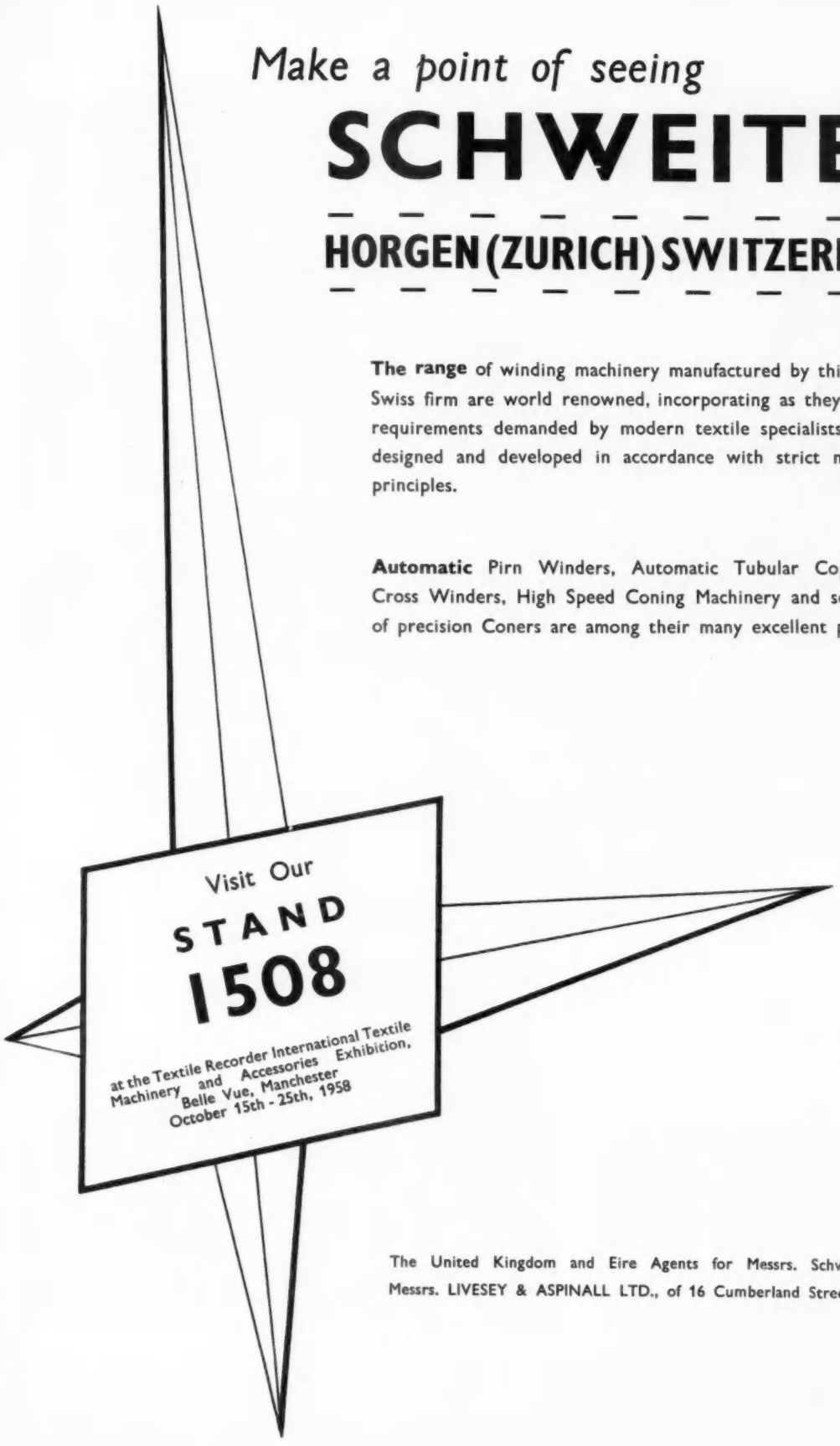
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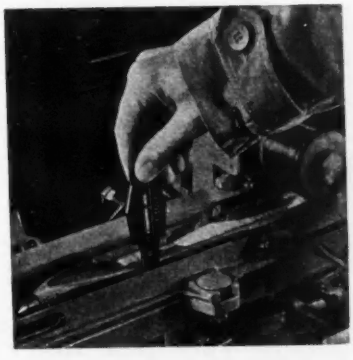

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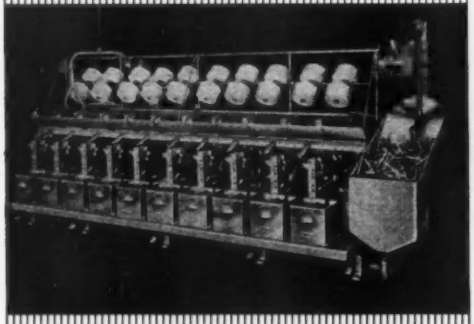

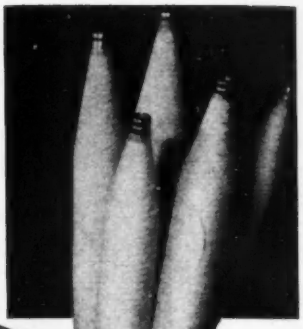

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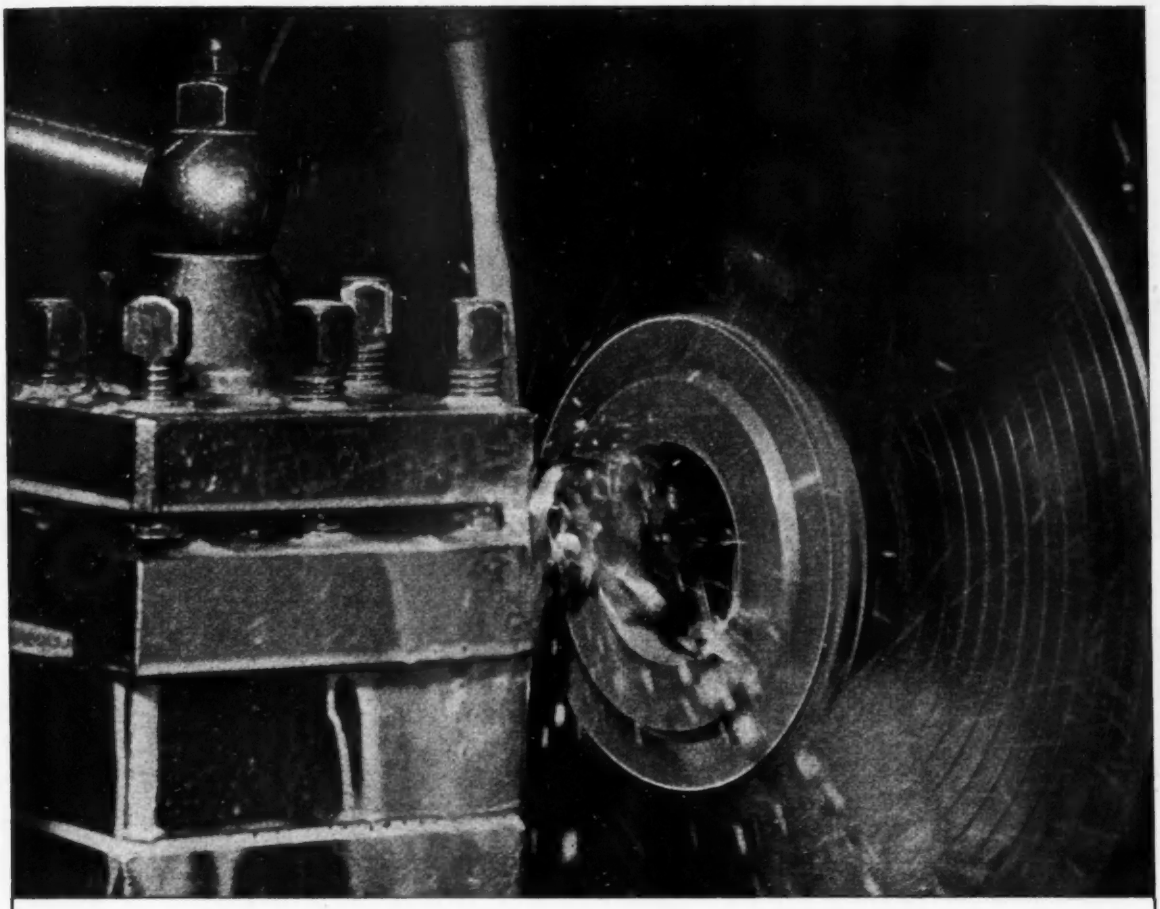

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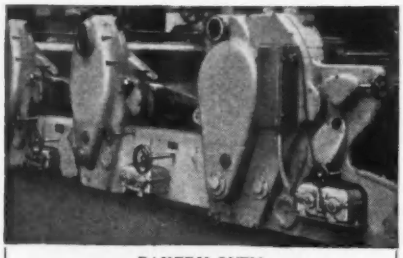
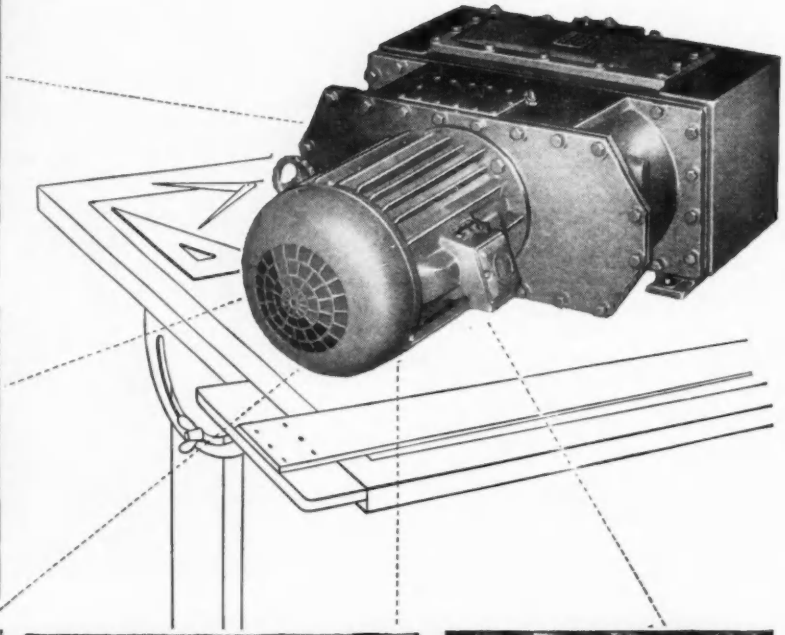
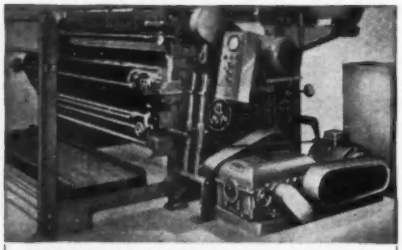
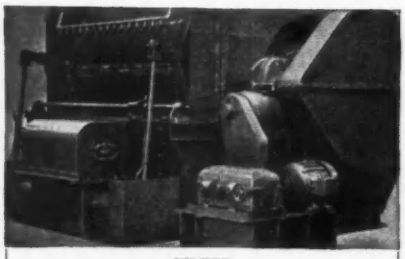


BAKERY OVEN
Courtesy T. & T. Vicars Ltd.

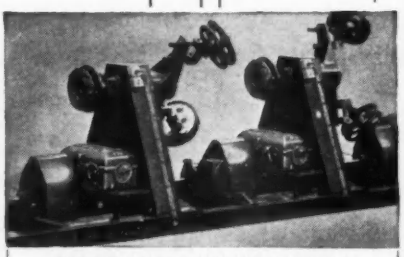




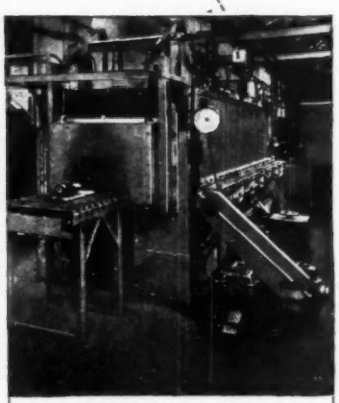
DOUBLE CARPET SHEARING MACHINE
Courtesy William Whitely & Sons Ltd.



FILTER
Courtesy Davey Paxman & Co. Ltd.



RUBBER TAPE CAPPING MACHINE
Courtesy B. & F. Carter & Co. Ltd.



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Highly efficient ball bearing pulley-blocks, with genuine triple-gear mechanism. Sizes up to 20-tons.

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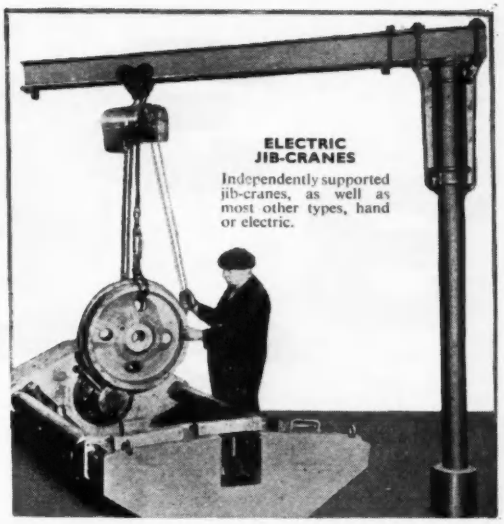

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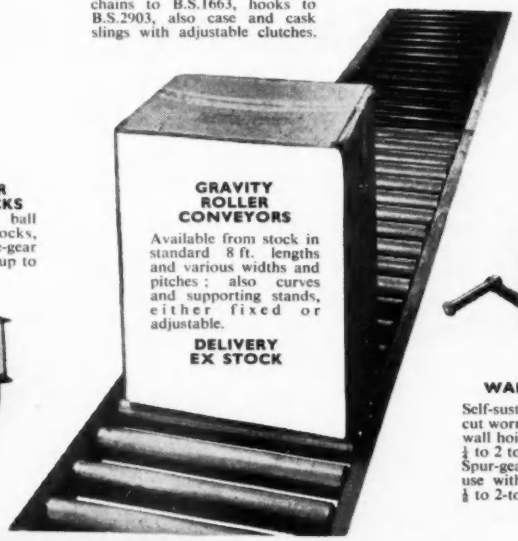

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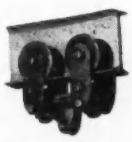

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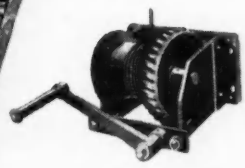
Ball-bearing electric chain hoists for loads up to 1-ton. Pendant or push button control suspension, travelling (push or geared) and dual speed types.



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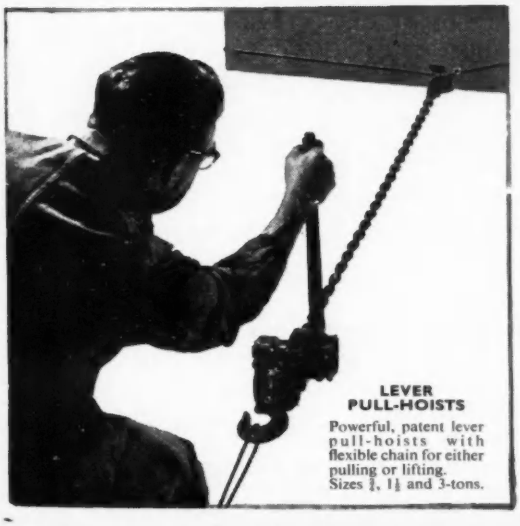

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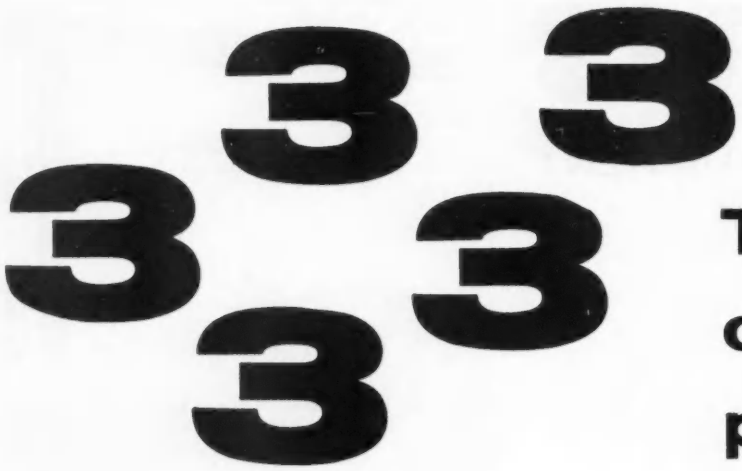

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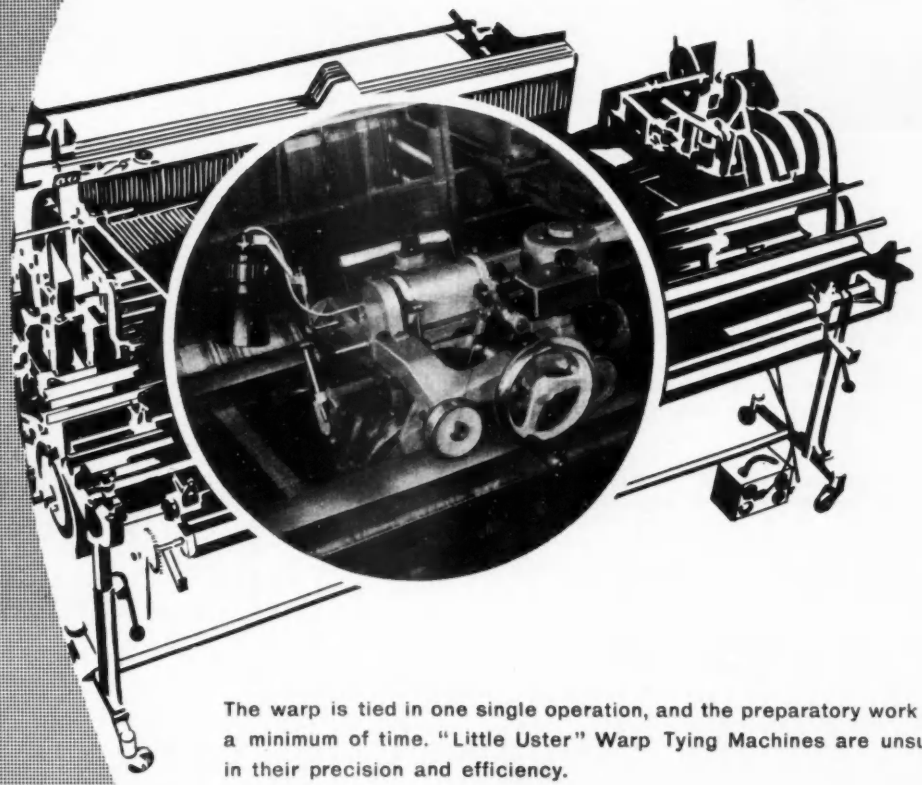

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Question — *It is a recognised fact that electronic air filtration is the most efficient method of cleaning air, but surely it is also the most expensive?*

ANSWER — **Certainly not! With the Trion Electronic Air Filter, the initial cost is the only cost. Maintenance costs are negligible and no expensive replacements are necessary.**

Question — *But does it not consume expensive electric current in large quantities?*

ANSWER — **Consumption of current is at the rate of 10 watts per 1,000 c.f.m. cleaned. For the price of burning a 100 watt bulb, 10,000 c.f.m. can be Trion cleaned. Because of the constant exceptionally low resistance to flow, less fan horsepower is absorbed resulting in a saving of current.**

Question — *Why use the term 'photometric efficiency'? Surely measurement by weight is more readily understood!*

ANSWER — **The Trion Electronic Air Filter removes particles less than one hundredth of one micron in size and it would be impracticable to work on a weight basis. It must be remembered that although these particles have high soiling properties they have very little weight — 8,000,000 particles of 0.1 microns have the same weight as a single particle of 20 microns.**

Question — *Surely the cleaning of dust from these filters is a most unpleasant task?*

ANSWER — **Not at all. The built-in washing system carries away accumulated dust to the drains.**

Question — *Is there any literature that would help in planning an installation of Trion Electronic Air Filters?*

ANSWER — **An interesting and comprehensive brochure, Publication No. 67/32 gives details of the types and sizes of equipment available. Ask for a copy now.**

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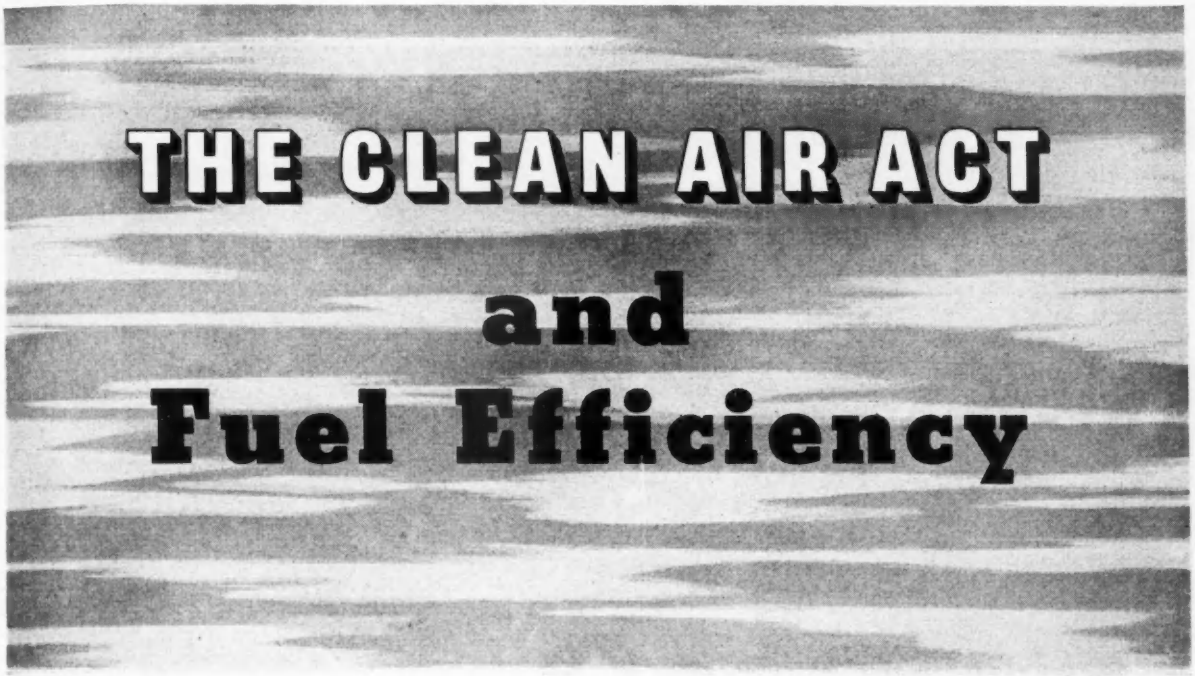

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More about this in leaflet No. ZK/21

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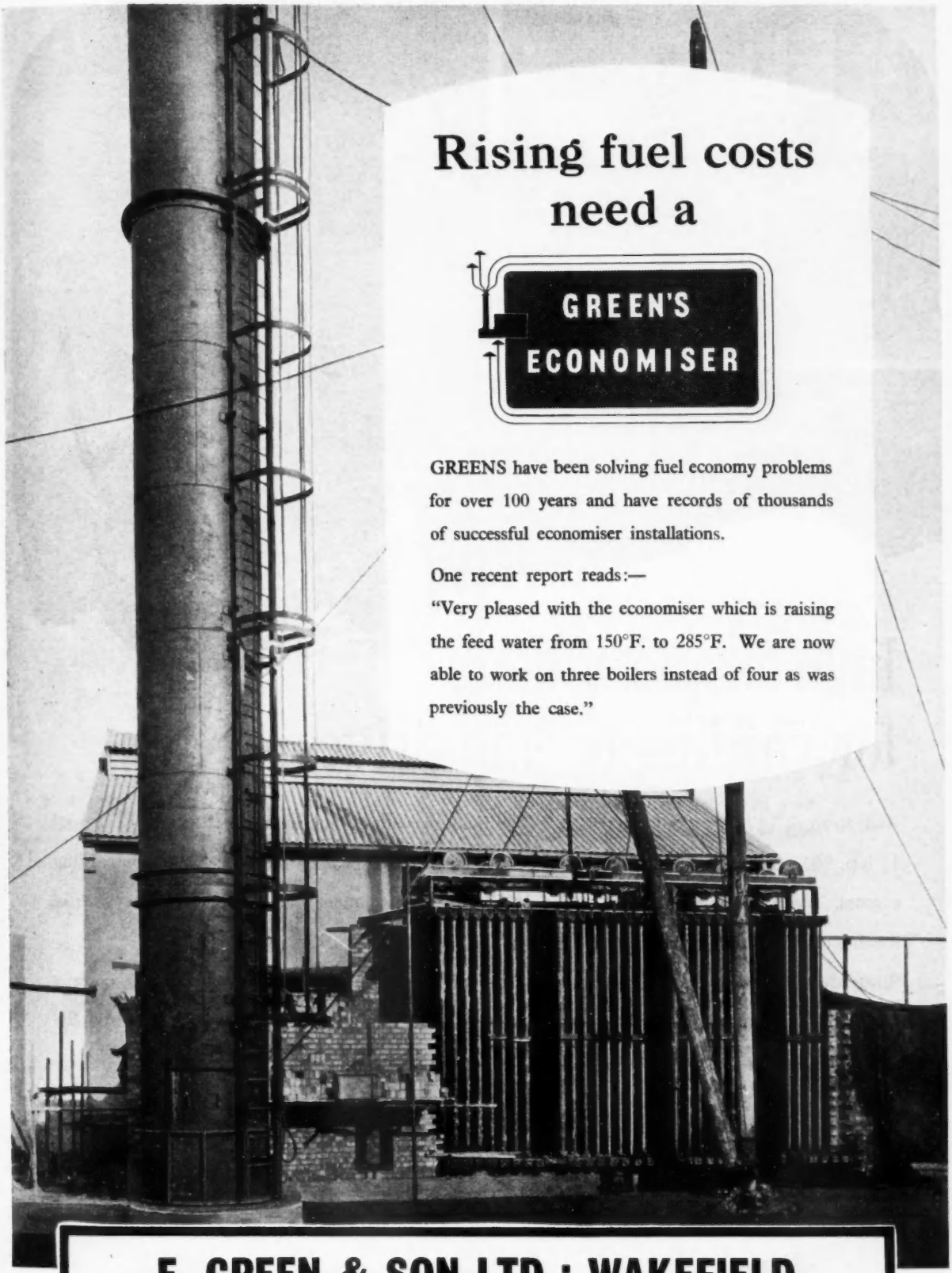

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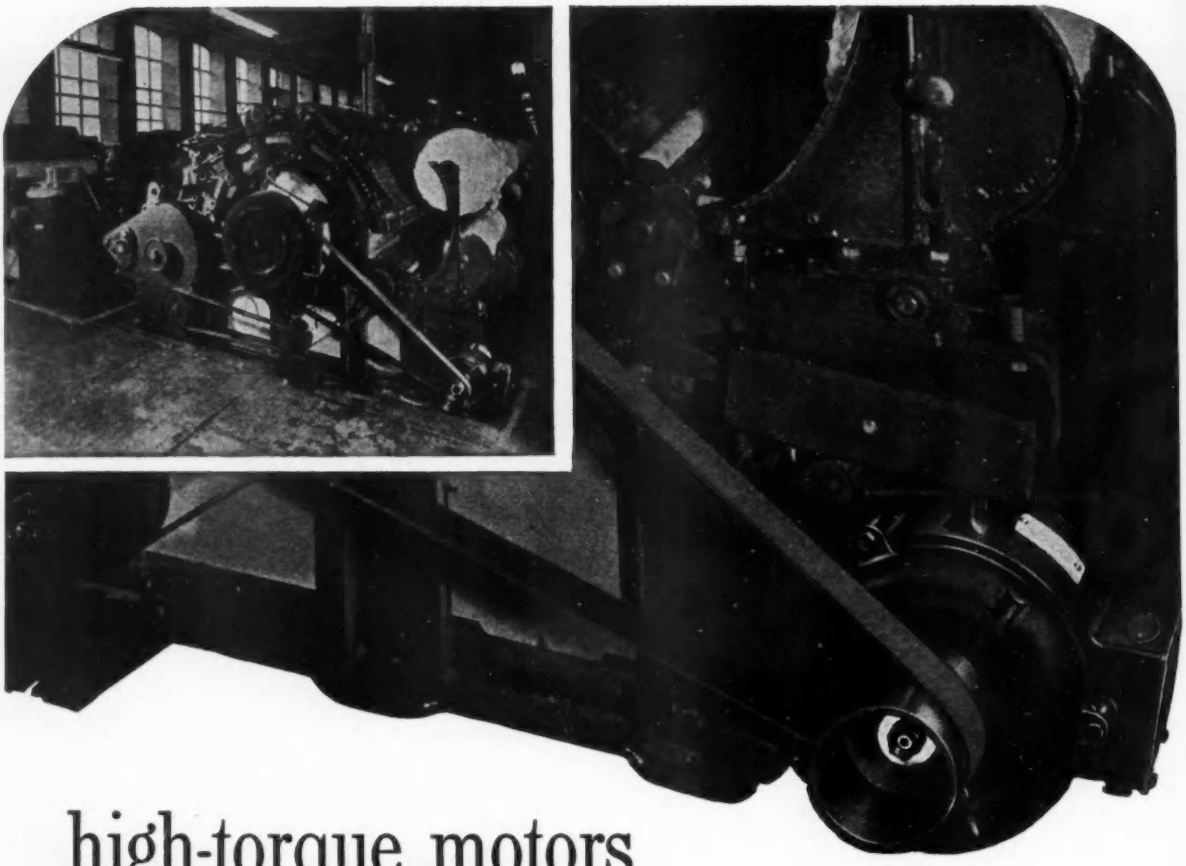

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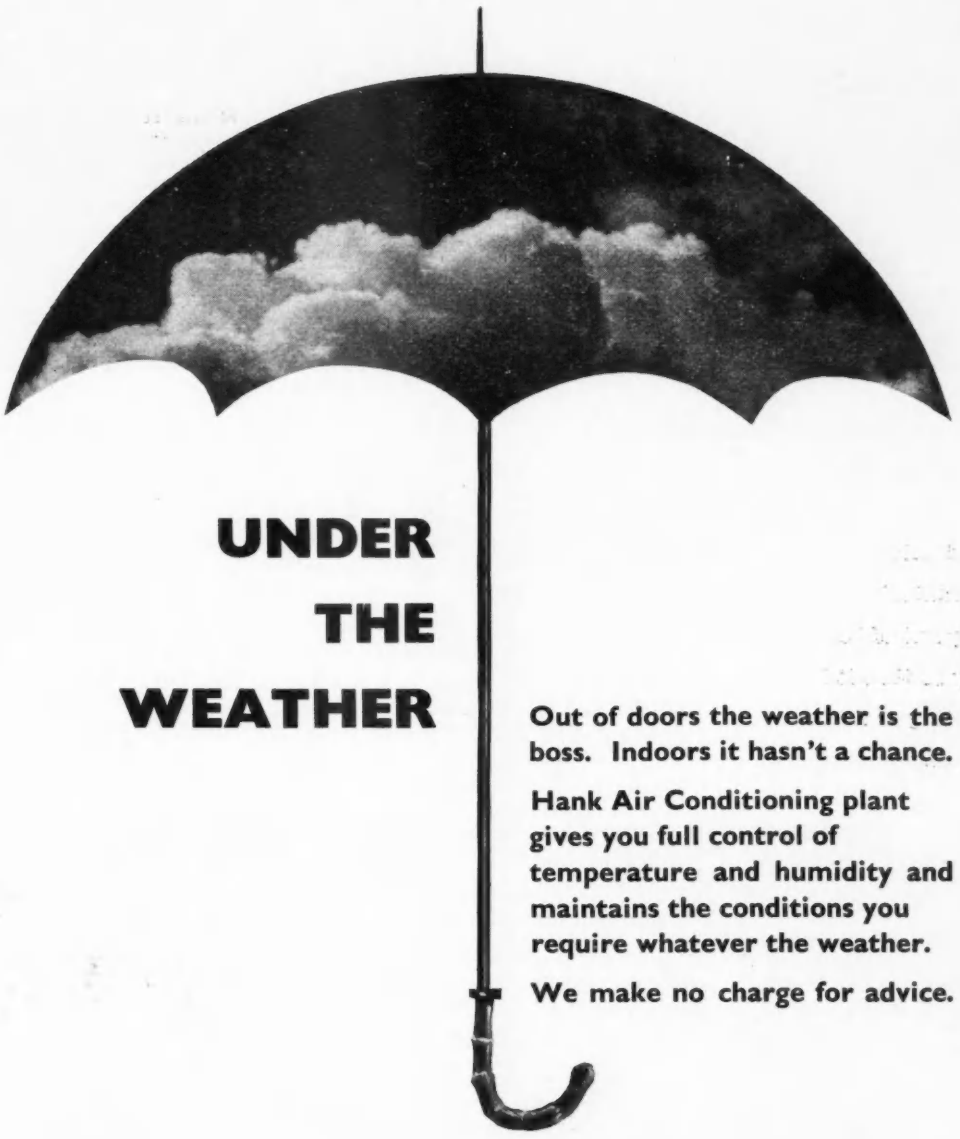

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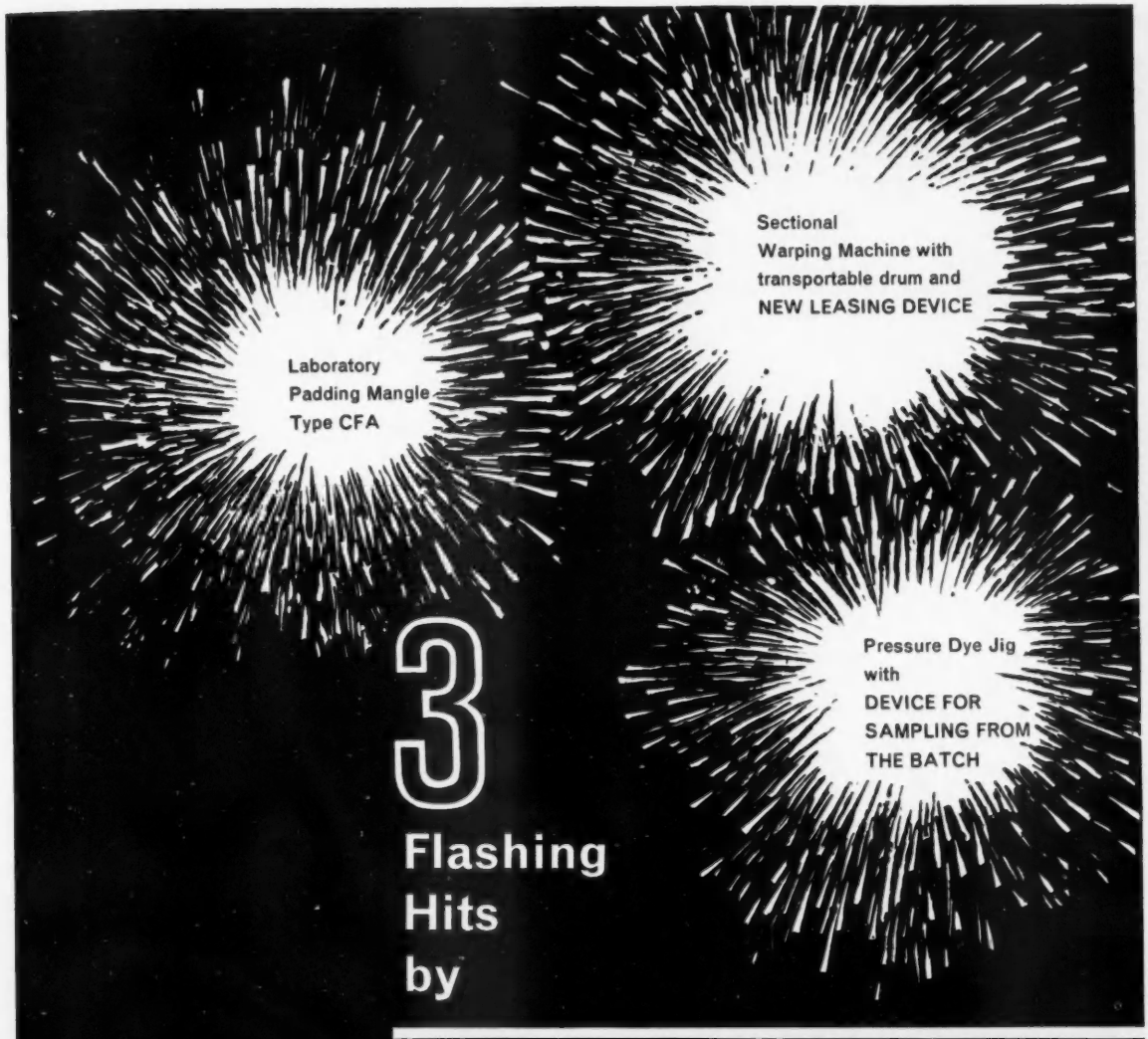

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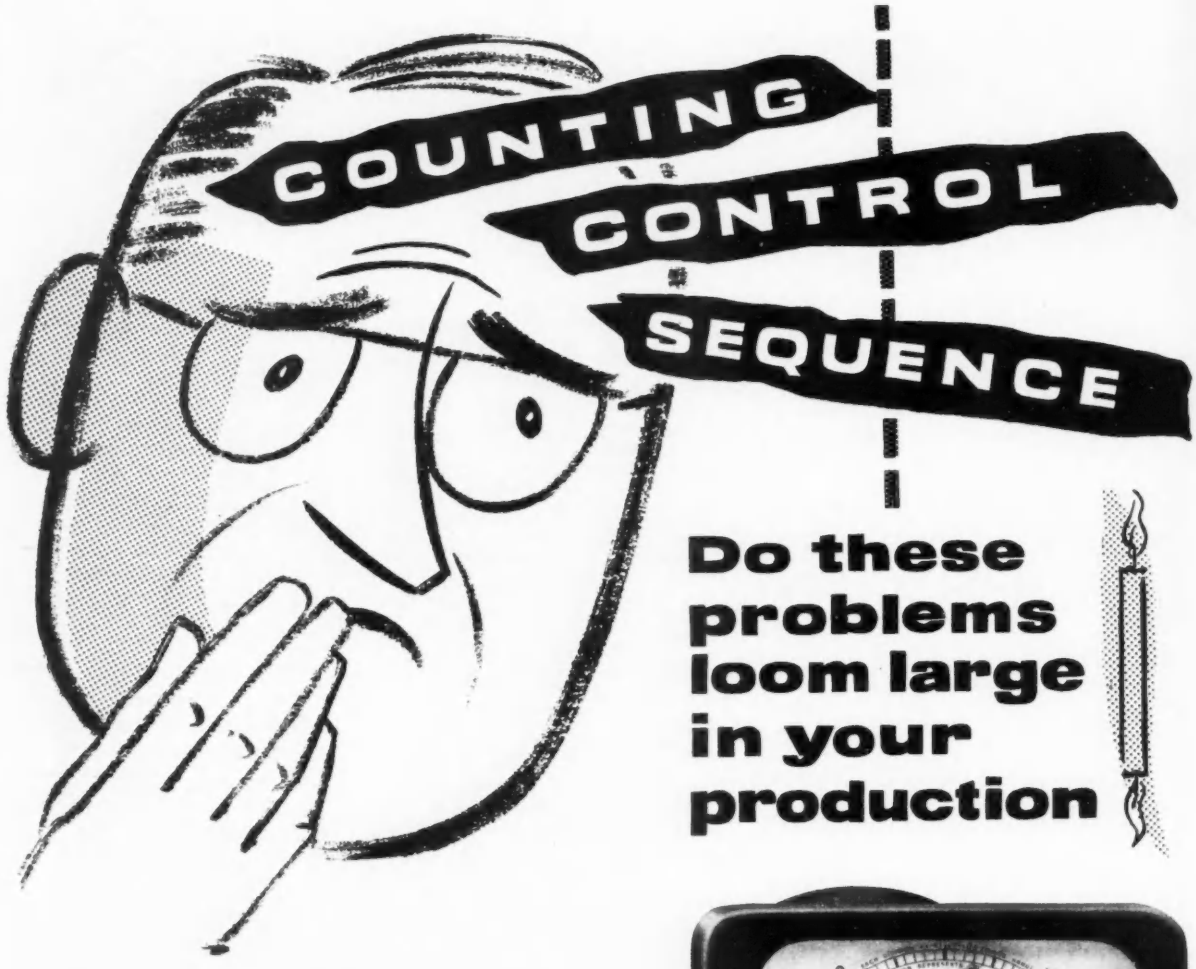

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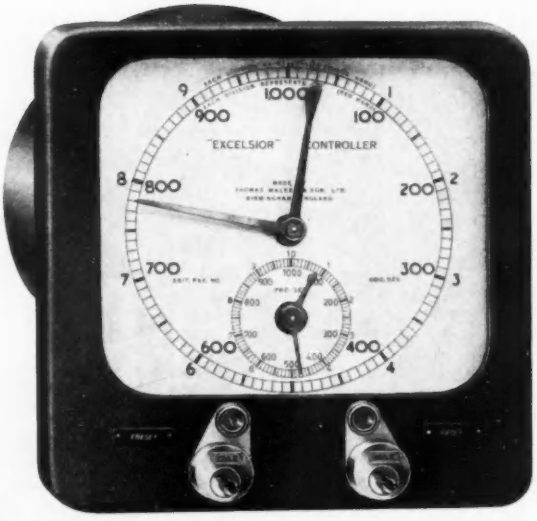

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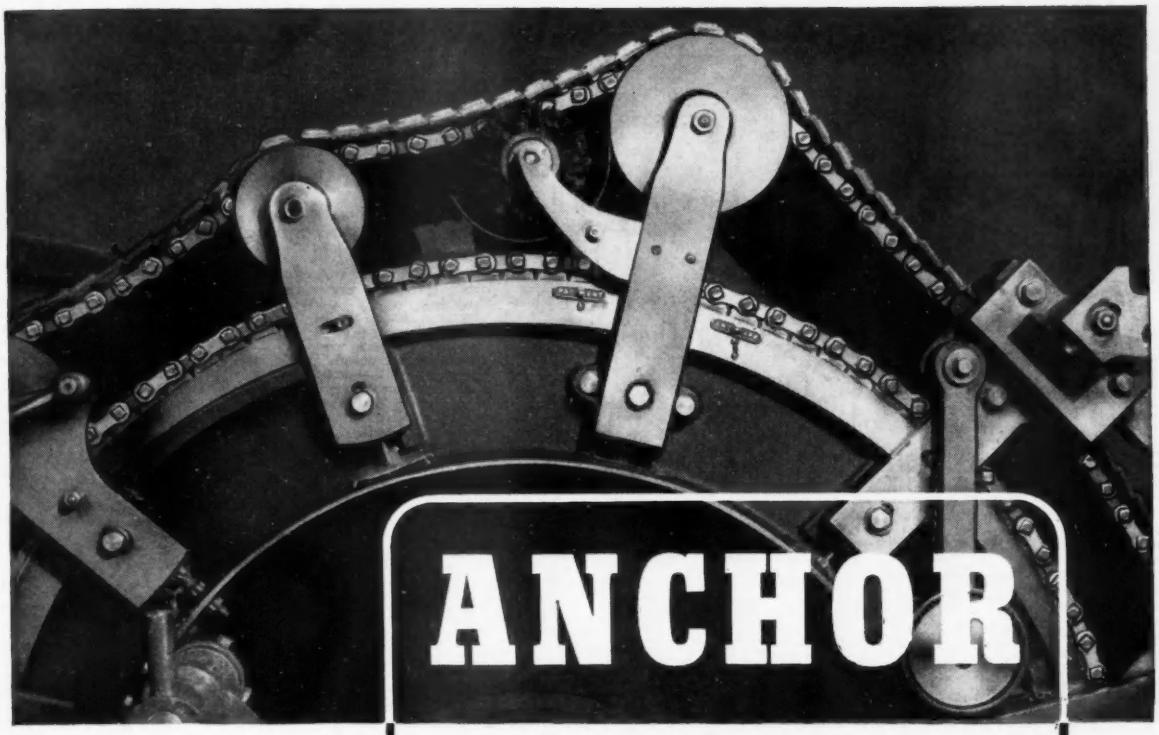

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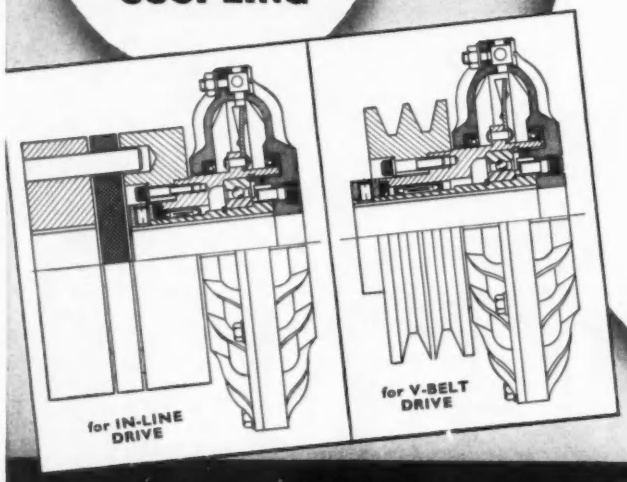

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RAYON STAPLE FIBRE SPINNING

By S. A. G. CALDWELL, F.T.I.

Nothing in the whole field of fibre technology has achieved any greater degree of success or wider application in the various spinning and weaving sections of the industry than rayon in both filament and staple fibre forms. Increasing recognition of the valuable physical and chemical properties, distinctive characteristics, relatively low cost, and ever widening uses have resulted in a tremendous expansion in recent years. Despite the spectacular advances and the extensive literature available, however, few attempts have been made in any publication to deal specifically and thoroughly with any single aspect of this extremely important subject. Most of the information concerning rayon staple spinning has appeared as articles in the various technical journals or as lectures to the textile societies, but in this new book the author has made a determined effort to compile in one volume as much detail as possible concerning the technique of spinning. Following a concise review of the economics of the industry, the book deals systematically with fibre production and the intrinsic properties, opening, blending, carding, drawing and spinning on the cotton, woollen and worsted, flax and jute type systems, with production and machine calculations and yarn characteristics at every stage. This brief but comprehensive work immediately commends itself as an invaluable source of reference to all engaged or interested in the spinning of rayon staple and future developments.

Demy 8vo — 170 pages — 76 illustrations

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1. Economics of the Industry.
2. Fibre Production and Properties.
3. Filament Spinning and Stapling.
4. Opening and Blending on the Cotton System.
5. Description and Function of the Revolving Flat, and the Roller and Clearer Card.
6. Drafting on Roller Frames.
7. Cotton-type Spinning-frames.
8. Sliver Forming on Flax- and Jute-type Cards.
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11. Sliver Forming on Woollen- and Worsted-type Cards.
12. Worsted Systems of Preparation.
13. Spinning on Woollen- and Worsted-type Frames.
14. Opening of Waste Materials.

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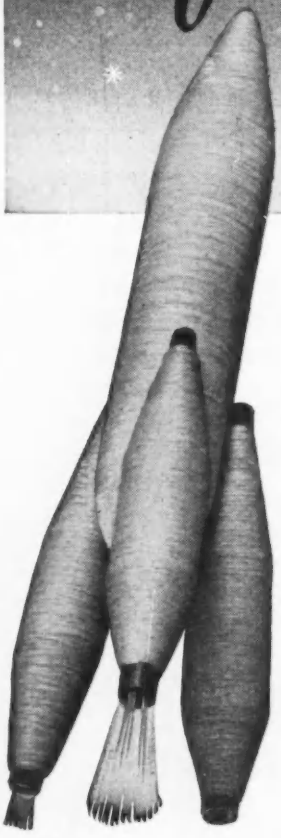

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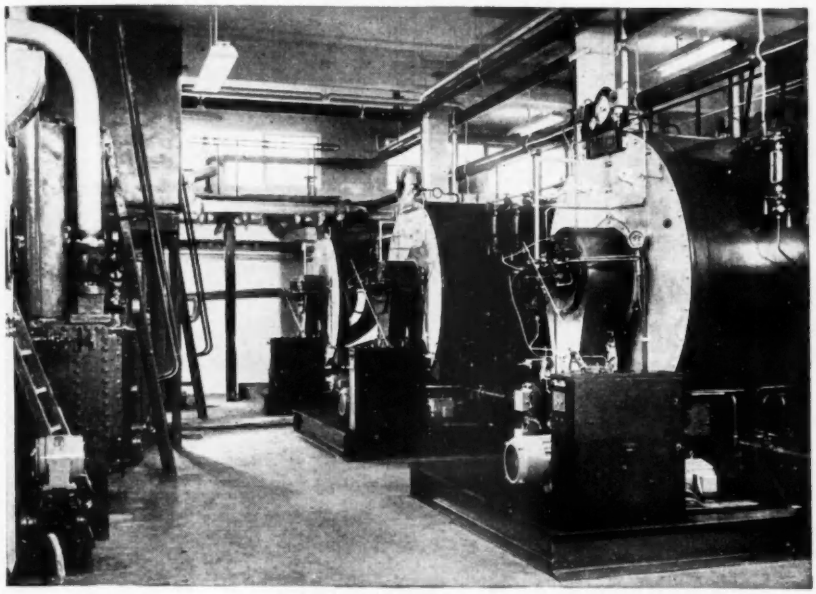

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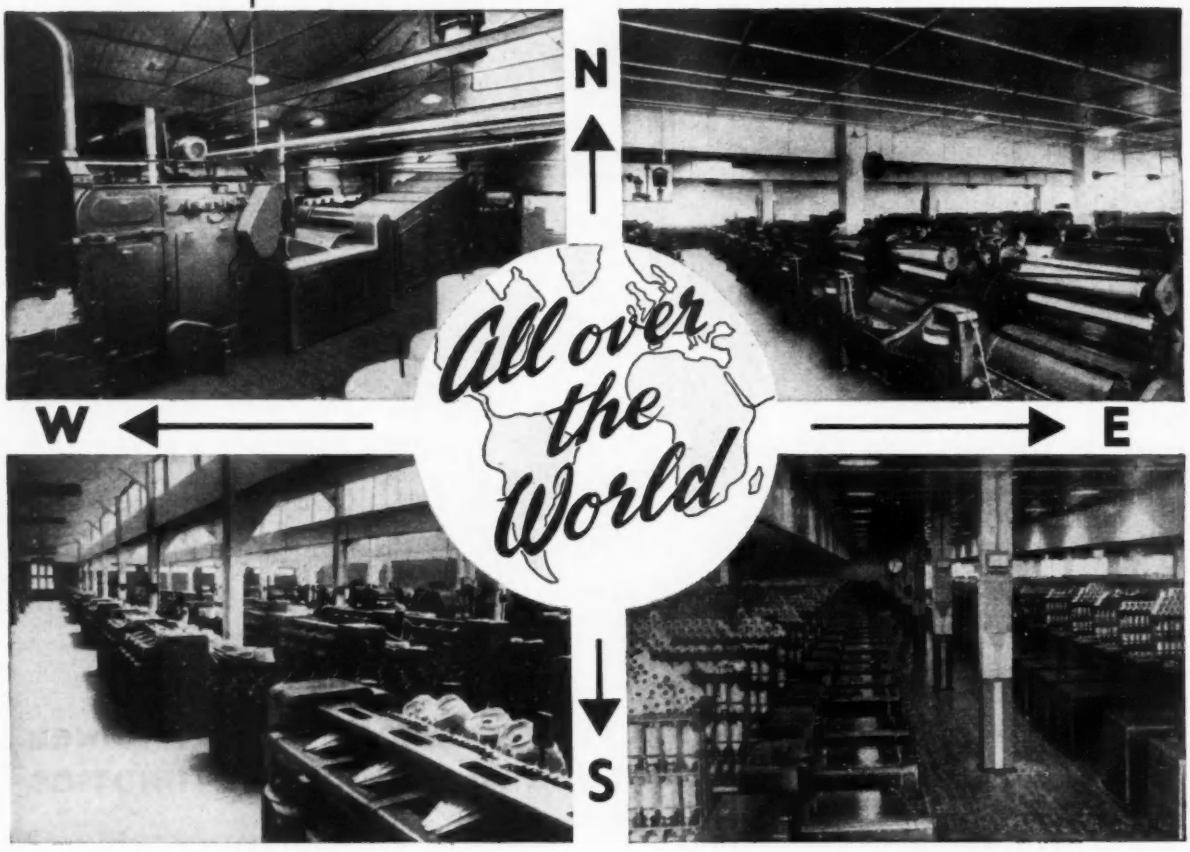

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MATERIALS - PROCESSES - PRODUCTION - MANAGEMENT

NO. 1005. VOL. 84 - SEPTEMBER 1958 - MONTHLY Two Shillings and Sixpence

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THE TEXTILE MANUFACTURER (*Incorporating* TEXTILE INDUSTRY AND EXPORTER, THE TEXTILE MACHINIST, THE HOSIERY, LACE AND SILK MANUFACTURER, *and* THE TEXTILE COLOURIST) is published on the first Monday of every month.

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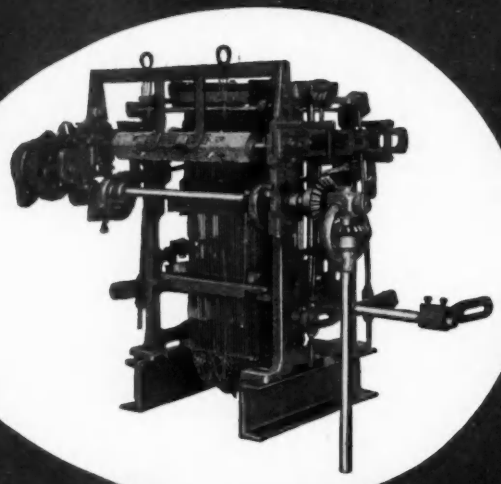

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THE TEXTILE MANUFACTURER

No. 1005. Vol. 84 Two Shillings and Sixpence September, 1958

Notes of the Month

TEXTILE MACHINERY EXHIBITION

THE international textile machinery exhibition at Belle Vue, Manchester, will be opened on October 15 by Sir Ernest Goodale (chairman of Warner and Sons Ltd.) amongst whose many high offices are numbered those of president of the Textile Institute, vice-president of the Royal Society of Arts, president of the Silk and Rayon Users' Association and vice-president of the British Man-Made Fibres Federation. For the first time at these exhibitions there will be exhibits from Spain, Poland and Hungary. In terms of mere size, and in terms of international participation, not less than in the variety and interst of the machinery on show, this exhibition which is devoted entirely to the machinery, accessories and ancillary equipment used in the production of textiles (knitgoods and hosiery excepted) should surpass any exhibition of its kind yet held.

The range of spinning machinery incorporates cotton opening and blowing room machinery, wool blending, conveying and oiling systems, special carding machines for synthetics and various types of spinning machines for cotton, wool, worsted and the man-made fibres. Special mention should be made of the latest equipment for the shortened processes for worsted spinning and, in connection with the spinning of man-made fibres, of tow-to-top and direct spinning machines. Examples of drafting systems capable of dealing with a wide range of staple lengths are also featured as are numerous types of high drafting systems for spinning various types of yarns.

Machinery for the preparation of yarns for the weaving process is perhaps the most ingenious of any used in textile processing in that the mechanisation of operations formerly performed manually has reached a very high degree of perfection in these machines. On view to the public for the first time in this country is an automatic pirn winder fitted to the loom; the two processes of winding and weaving are carried out simultaneously. Numerous other types of pirn, cheese and cone winding machines, many of them fully automatic, will be exhibited, whilst a variety of the latest uptwisters occupy a prominent place. High speed beaming and warping machines of the latest types, with electric and electronic control devices, are on view, whilst a feature is an extensive range of reaching-in, warp-tying, dropper pinning and denting machines.

The weaving machinery on view is comprehensive and includes the latest designs of automatic looms, for all types of fabrics, manufactured by British and overseas makers. Of considerable interest are the shuttleless looms on view, one being of a propelled weft gripper type, whilst the other employs a pneumatic method of propelling the weft across the loom. One of the outstanding exhibits is the "Shirley" automatic loom, whilst carpet weaving machinery is also a feature of this exhibition. A comprehensive selection of jacquards and dobbies is also being exhibited.

Some of the most interesting machines on view are included amongst the dyeing and finishing machinery, from which should be mentioned a single strand molten metal dyeing machine and a polymerising machine of new design. Fluid bed dyeing will also be featured, whilst a flash steaming machine for the fixation of printing fabrics is being shown complete with the necessary chemical padding mangle. Automatic dye jiggers, high pressure turbo dyeing apparatus, yarn and piecegoods dyeing machines, an open width bleaching range, stainless steel bleaching and dyeing machines, automatic screen printing machines, mercerising machines and innumerable finishing machines are also on view.

There are many examples of specialised machines and equipment used in the production of modern textiles included in the exhibits, amongst which special mention should be made of the carpet tufting machines, and latex spreading and drying machinery. An automatic conditioning turbine for textile yarns, yarn conditioning machines and baling and bundling equipment are also included. Heald and reed making machines, reed cleaning and grinding machines, and drop wire cleaning machines are also on view. Air conditioning and humidifying plant, industriai suction cleaners and vacuum cleaning plant will create interest.

Developments in instrumentation is a feature of several exhibits and the range of testing equipment on view is worthy of special mention. As is to be expected in an exhibition which embraces machinery for almost every phase of textile production from the early stages of preparation prior to spinning, spinning, yarn preparation, weaving, bleaching, dyeing and finishing, the range of accessories displayed is extensive. Amongst these are to be found all types of bobbins, pirns and tubes made from many materials as well as the receptacles for the various textile packages such as weft boxes, pirn trays, bins, stacking and nesting boxes, and trucks and trolleys, including fibreglass trucks to suit every purpose.

DEVELOPMENTS IN FLAX HARVESTING

THE major costs of producing flax in Northern Ireland arise when the crop is pulled and in tying before and after retting. The cost of scutching is also disproportionately high but the new experimental programme put in hand during 1957 by the Flax Development Committee and which requires several years continuous work for completion, is designed to find means of reducing these costs and in this way to increase the cash value of the flax to the grower. As a first step, modern Leterme pullers have been put to work in all flax districts. They were shown last season to be superior in speed and quality of work to anything that had been seen in Ireland previously. The flax is laid neatly in the form of a swathe, but this season a coupled binder is being used experimentally to see if hand gathering and tying can be eliminated, the flax being delivered to a conveyor which takes it to the binding head, instead of being spread on the ground, the whole operation being automatic. The attachment is, as on the Continent, working satisfactorily and where the crop is standing sufficiently well to allow of machine pulling cuts harvesting costs substantially. Three such combined machines are available for work this season. An alternative system using a pick-up binder will also be tried out this year, both with the green crop and with dried damretted straw.

Although the way flax has been tossed by the abnormal weather in July has reduced the percentage of flax suitable for mechanical handling in the current season, there are two long-term factors which make machine harvesting more practicable than ever before in a normal season. One is the ability to resist lodging of the Wiera variety, which is now the flax most commonly grown in Northern Ireland. The other is the fact that weeds can be checked by chemical means if despite careful choice and preparation of the ground they are present to an undue degree. A crop pulled free of weeds is easier to ret evenly and to scutch, so the Flax Development Committee attach great importance to weed control.

Dam retting is still the method used for preparing two-thirds of the flax grown in Ulster for scutching, but it has so many undesirable features that the search for a sound alternative is being actively pursued. This season, a system of semi-dew retting will be investigated under normal commercial conditions. Initial experiments have been encouraging. The object is to remove the "sticking shive" factor which has hindered progress with the use of unretted flax and to produce flax straw in a state which would enable it to be scutched more economically than is possible with dam retted.

COMFORT IN CLOTHING

AN increasingly important point in the sale of clothing is the comfort factor. More people are now buying clothing with an eye to "comfort" as well as wearing properties and fashion, believes Professor Nils Gralen, F.T.I., the eminent Swedish textile scientist, who attended the High Polymer Conference held recently at Nottingham. Because of people becoming more "choosey" in the subject of clothing keen interest was being shown in Scandinavian and other European countries in the forthcoming Textile Institute Conference at Gothenburg (September 4-8 and Copenhagen on the 9th) on the subject of "The Mechanical Properties of Textiles." "With this greater demand by world peoples as a whole for greater comfort in clothing, the mechanical properties—knowing all we can about the mechanical properties of fabrics, how they will make-up and how they will perform in wear—is of ever-growing importance," said Professor Gralen.

The development of blended fabrics, with the natural and man-made and synthetic fibres, had emphasised again the need to know more about the mechanical properties. "People are becoming more clothes conscious," said Professor Gralen. "The need, therefore, for the clothing industry is to know how fabrics will react when being made up: mechanical properties of the materials ought to be better known than they are for the clothing industry, and so far as the Swedish industry is concerned, both the cloth producing sections and the Swedish clothing industry, full advantage is being taken of this conference which is a very important one for us."

The Swedish textile industry had, in common with other textile industries, experienced some reduction in volume of output and there was also great competition from other countries. Although labour costs tended to be high, the Swedish industry had high technical skill and first-class plant. The industry had kept apace of technical developments and had contributed materially to world knowledge of textiles by her own research work. The clothing industry of Sweden was very well organised indeed, said Professor Gralen and exceedingly up-to-date from a competitive sense. The quality of its products was high. Bespoke tailoring in Sweden was very small—the great majority of Swedes purchased ready-made clothing—but the standard was very good. In recent years the Swedish clothing industry had started to export and had attained not inconsiderable success, especially to the U.S. as well as other European countries. Professor Gralen expressed the hope that there would be a good attendance to what would be a conference of great importance and significance.

WORLD WOOL CONSUMPTION

ALTHOUGH world consumption of wool in the second quarter of 1958 is estimated to have fallen by about 5% compared with the first quarter, the daily rate appears to have declined by less than this as there were fewer working days in the second quarter. The April-June total for ten of the largest manufacturing countries was 404 million lbs. (clean), according to Commonwealth Economic Committee estimates. The comparative figure for the first three months of the year was 426 million lbs. Four countries showed increases in actual consumption after the sharp falls of the previous quarter. In Japan, consumption rose by 7%, and in Italy and the Netherlands it increased by 1% and 6% respectively. Australian usage is estimated to have shown an improvement of 3%. There were declines, however, in all other listed countries. In the U.S., usage fell by 2%—a rise of 12% in apparel wool usage being more than offset by a reduction of 26% in carpet wool. In the U.K. there was a decline of 7%, though the quarter's consumption of 109 million lbs. is still nearly 30% larger than that of any other country for which figures are available. West Germany and Belgium showed declines of 5% in each case and there was a sharp fall of 18% in France.

A total of 54,200 bales is expected to be available for the next London wool sales, which will take place in the fortnight beginning September 8. The total offering will be made up of: Australian (10,500 bales, comprising 8,500 greasy and 2,000 scoured). New Zealand (32,500 bales, comprising 9,500 greasy, 7,000 scoured and 16,000 slipe). South African (1,300 bales, comprising 1,100 greasy and 200 scoured). In addition there will be 4,800 bales of English, 700 bales of Kenya, 2,700 bales of Falkland Islands, 1,450 bales of Punta Arenas, and 250 bales of Chilean merino wool. The Committee of London Wool Brokers announces that Commonwealth wool will be sold on Wednesday and Friday each week. A separate sale of the British wool, offered on behalf of the British Wool Marketing Board, will take place on September 18.

Dust Control Methods for Plant and Products—III

Periodic cleaning of machinery is essential under all circumstances and the incidence of dust tends to increase the frequency of cleaning. Dust problems are now, however, as formidable as they used to be ; in many cases dust is effectively and quickly dealt with by means of vacuum equipment

By F. H. SLADE, A.M.I.MECH.E.

IN the "Pneumafil" group system, as previously indicated, the normal unitary boxes with their independent fans and motors are replaced by a more compact group collection box at the end of each frame. A duct connection is made to each box which connects into the main extract ducting; accommodated overhead or alternatively, in trenches under the floor. This main ducting is coupled to a central fan serving the entire system; discharging air from the system direct to atmosphere in hot weather and recirculating it back into the workroom during cooler periods. These operations are usually controlled automatically.

Both the unitary and group systems can further be designed to work in conjunction with a Carrier air-conditioning plant. Such an arrangement, shown diagrammatically in Fig. 20, is known as the "Cacap" patented system. As will be observed provision is made for either direct discharge of air from the machine to atmosphere, or recirculation, i.e. in warm weather conditions it is expelled outside the building and in winter it is thoroughly cleaned in the air-conditioning plant before re-distribution.

As with unitary "Pneumafil," suction flutes replace the revolving undercleaners and a filter box containing a filter screen to retain the collected ends is fitted to the end of each frame, but these filter boxes have no fans and motor and require little floor space. A common suction duct (placed either overhead or beneath the floor) and fan serves all the ringframes, forming a complete extract system for the ring room. Overhead ducts distribute conditioned air from the central station plant; the "Pneumafil" suction flutes on the roller beams of the frames ensuring that the conditioned air is drawn into the working zone, and on to the yarn being spun.

Another problem to which Carrier Engineering Co. Ltd. are giving their attention is that concerned with the habitability in the high-speed beaming section of mills, and in consequence, they are now able to offer a fly and dust extraction system for use in conjunction with high-speed beamers. This plant, illustrated in Figs. 21 and 22, consists essentially of an efficient extraction hood (Fig. 21) and an air supply duct provided with outlet orifices along its length (Fig. 22). The latter serves to form a current, or screen, of air behind the combs, which directs the fly and dust carried forward by the yarns into the operational path of the extraction hood. In this way, about 80% of the fly and dust normally given off by the front of the high speed beamer is collected.

An air curtain is also employed in the patented Sturtevant system applied to high-speed cone winders; to remove the dust and fly from the breathing zone in which the operator works. This utilises a Sturtevant No. 6X 5-stage turbo-blower which delivers air to four branch mains, suitably graded and drilled $\frac{1}{8}$ in. dia. holes at 4 ins. pitch along their entire length. These air-outlet holes are so located that when the mains are fixed to a 10-section frame ("T.M.," April 1956), the air issuing from the outlet holes at high velocity, forms, in effect, a curtain, which prevents refuse from rising to breathing level.

Vacuum Plant

Many other features are incorporated in machine design to ensure cleanliness and dust control. For example, the

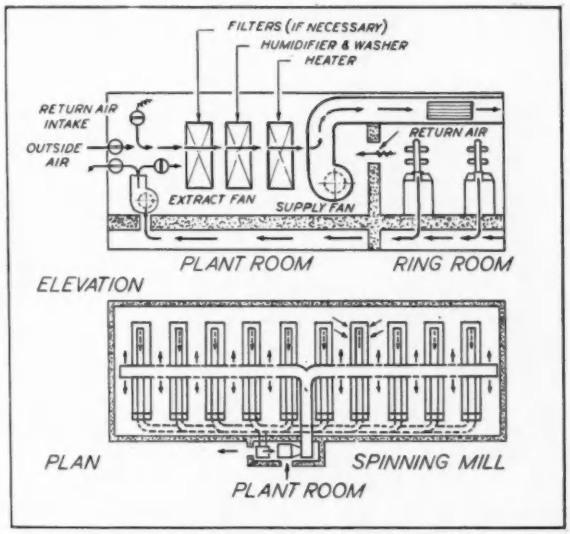


Fig. 20. In summer air from the filter boxes is exhausted direct to the external atmosphere, and in winter it is thoroughly cleaned in the air-conditioning plant for re-distribution

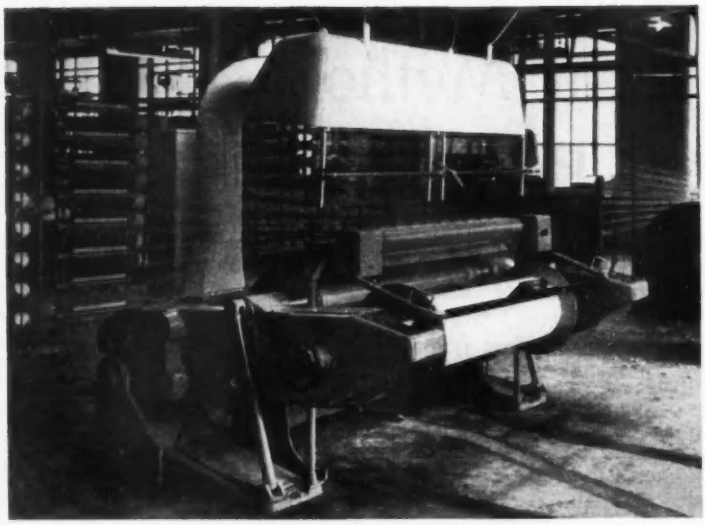


Fig. 21. Fly and dust are directed into the extract hood by means of a current of air formed immediately behind the combs

stripping of cards by vacuum, or by a combination of rotating brush and vacuum, has proved the most effective method of removing all dust, fibre and seed. This further is exemplified in a mill to which the vacuum plant was supplied by Atlas Copco. The cards, of Howard and Bullough manufacture, are fitted with two suction nozzles, one for the doffer and one for the roller, which move at suitable speed forth and back over the doffer and roller while these rotate. The nozzles are connected to the vacuum system by a common hose. When the card requires stripping, the feed is stopped and the machine allowed to run idle. Before the flexible hose which connects with the vacuum system is fitted to the nozzles, the card is roughly stripped. This is effected by bringing the hose to bear upon the points where the fibre and dust have accumulated in large quantities, causing rapid removal of these deposits. After the flexible hose has been connected to the holder common to the nozzles, the roller and the doffer are thoroughly stripped in a minute, and the process is repeated on the next card.

The fibre and dust accumulations are carried through the vacuum system pipes to receivers where the coarse material is first separated by the air passing through a perforated plate. The finer particles are filtered away during passage through sacks in another receiver. It is, of course, important that the vacuum air should be carefully filtered before entering the vacuum pump, otherwise the latter will become rapidly fouled and have to be taken out of service for cleaning. The vacuum pump installation consists of two Atlas vacuum pumps AA10 each V-belt driven by an electric motor. The pumps have a piston displacement of 807 cu. ft./min. at 600 r.p.m., and the vacuum obtained amounts to 92–94%. By means of the vacuum provided by these two pumps, about 90 cards are stripped continuously after every two hours' and forty minutes' running.

Free Dust

So far, dust control has been discussed in the light of its collection and transport from the point of origin, together, in some cases, with its extraction from the atmosphere by means of air filtration equipment. However, even these control measures do not entirely obviate the prevalence of free dust, particularly in the vicinity of preparing machinery. It should first be understood that very small increments of dust and fly, through settlement, will ultimately build up into dust layers on beams and machines. These layers or deposits

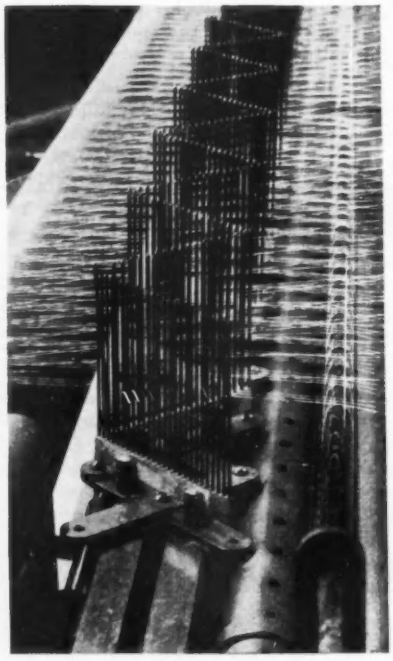


Fig. 22. Close up view of air supply duct, provided with a series of air outlets along its entire length

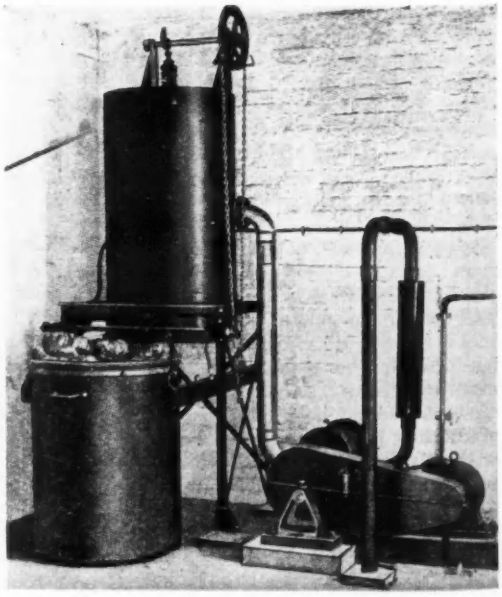


Fig. 23. "Siracco" pneumatic cleaning plant of the central or fixed type; comprising a motor driven rotary exhauster, fabric filter with mechanical rapper and a removable sack container

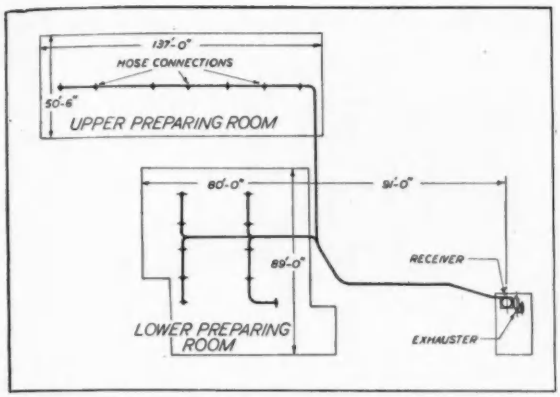


Fig. 24. Designed for the purpose of dust collection and cleansing in carding and preparing rooms, this typical installation is provided with seventeen separate hose connection points

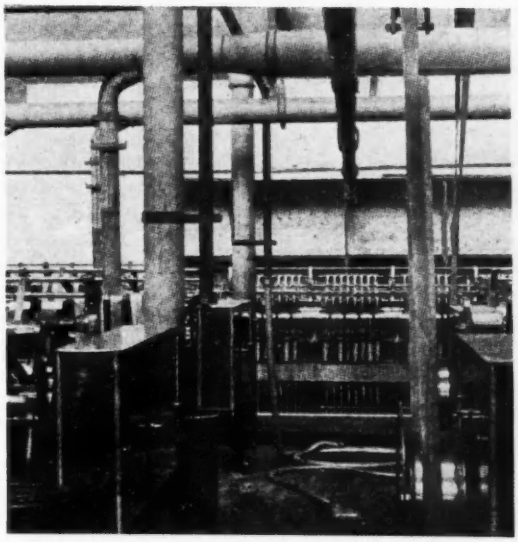


Fig. 25. Part-view of card-room, showing attachment of flexible tubing to hose connection ready for work

can have multiple adverse effects on production efficiency. Wastage of products can occur through soilage by oily and dirty fly falling from overhead accumulations, plant maintenance to maintain peak efficiency becomes a more serious problem.

Periodic cleaning of machinery is, of course, essential under all circumstances, but the incidence of dust tends to increase the frequency of cleaning. It can be effected manually, to the detriment of output and is rendered somewhat complicated when the dust deposits are in not easily accessible places. In addition the floor, walls and roof members of a workroom, also all overhead piping, etc., must be periodically freed from accumulations of fluff and similar dusty material. Mitigation of the dust problems is fortunately, not so formidable as it was formerly, for it is now generally recognised that it can be effectively and quickly dealt with by means of vacuum equipment.

Central Plant

Where conditions are favourable it is advisable to install a central vacuum cleaning plant, such as is shown in Fig. 23, which can provide the power, the multi-operation capacity, and what is of primary importance in such plants, the refuse container capacity. The installations are made in the manner shown diagrammatically in Fig. 24, in which is indicated a typical Sirocco plant; designed and built for the purpose of dust collection and cleansing in carding and preparing rooms.

The exhauster employed is of the positive type, operating at a speed of approximately 400 r.p.m. and chain-driven from a 6 h.p. electric motor. An automatic relief valve is fitted in the pipe-line on the suction side of the exhauster and thus, in the event of any obstruction becoming lodged in the line, or should any overload be inadvertently imposed on the driving motor, the valve will operate automatically and remain open until the cause of the overload is removed.

A combined air receiver and fabric filter, approximately 9 ft. long by 3 ft. dia., is also located on the suction side of the exhauster. This ensures that only dust-free air passes through the latter, so avoiding undue wear. The fabric filter is provided with hand-operated shaking gear for clearing purposes and this is actuated prior to emptying the sack or bag provided to receive the collected dust. The latter is housed in a sealed container below the fabric filter; arranged for easy removal and emptying.

The range of pipework shown consists of fabricated mild steel tubing fitted with bends of easy radius and flanges where necessary; it is provided in all with seventeen connection points to which suction hoses may be attached. The suction hose is of the metallic type; it is of light but robust construction, giving ample flexibility (as indicated in Fig. 25) while the interchangeable nozzles are designed to meet varying applications and effect the most efficient cleaning. Light steel extension tubes are also provided for cleaning roof members and other inaccessible points.

It is noted that the particular installation illustrated has been in regular service for a considerable period, working continuously and extracting from 400 to 500 lbs. of dust per day. These duties require that the sack container is emptied hourly. This dust control has obtained very definite and desirable results, for due to the absence of free dust and the more cleanly conditions which prevail for the workers, the output of the line and tow preparing machinery has been increased by about 10%, and in consequence, new spinning frames have been installed to deal with the additional rove output. It is found also that the yarns are generally cleaner, while the feed to the spinning frames shows improvement.

Whilst central plant of the type described, and those offered by Sturtevant Engineering Co. Ltd., provide a vacuum cleaning system which is labour-saving to the utmost degree, they may not be an essential requirement in all mills, or alternatively, more flexible equipment may be desirable for use in workrooms not serviced by a fixed plant. It is to meet these exigencies that portable industrial vacuum equipment has been developed. One of the range of Sirocco portable industrial vacuum cleaners and blowers is illustrated in Fig. 26, this consisting essentially of a motor-driven positive rotary exhauster capable of creating a very high vacuum, while the air volume remains approximately constant irrespective of the amount of material handled.

The exhauster in this case incorporates twin impellers operating with fine clearances, so that no internal lubrication is necessary. Specially designed grease seals are provided to

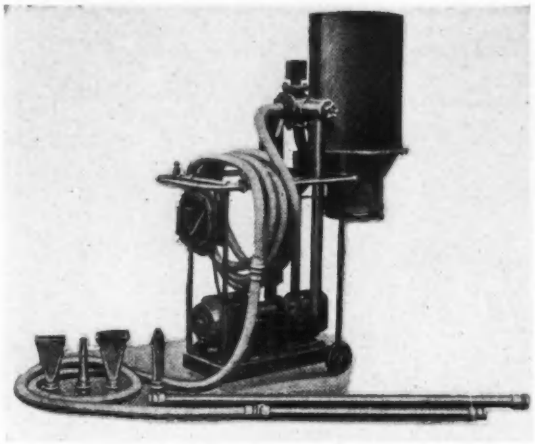


Fig. 26. The unit illustrated is also suitable for the cleaning of electric motors or similar machinery. By the employment of a multi-parted changeover valve the exhauster is easily converted into a blower to remove the dust that cannot readily be taken away by suction

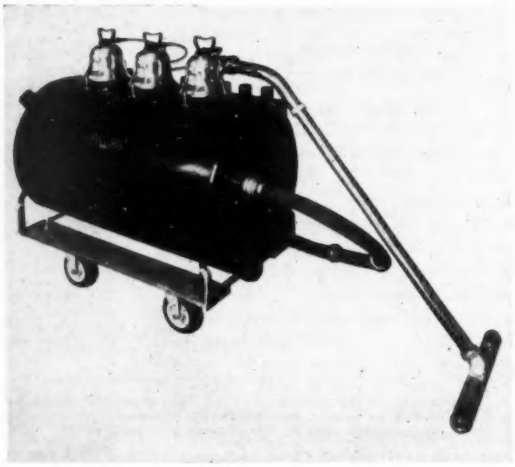


Fig. 28. The "Tellus" suction cleaner, Model T.150, has a dust capacity of 7 cu. ft., a power consumption of 1,350 watts and weighs 152 lbs.

prevent the entry of grease and oil to the interior of the machine, the timing gears being of nickel chrome steel operating in an oil bath. The unit is direct coupled to a 2½ b.h.p. driving motor of the squirrel cage type, controlled by push-button starter and complete with a generous length of trailing cable. The filter fitted is of a size capable of dealing with heavy dust concentrations and this is designed for easy and effective cleaning; by means of an arrangement whereby the air flow through the filter can be reversed.

The collected material is not stored inside the filter but in a small hopper underneath, from which it can be discharged into a sack nearby by merely turning a handle. Thus the capacity of the unit is not limited to that of a filter bag or receiver and it can in consequence be operated continuously. It is only necessary to replace the full sack with an empty one when the need arises. As previously indicated, the unit is dual-purpose in operation, in that it can also be used as a blower for the clearing of electric motors and similar machinery, or for removing dust that cannot be readily handled by suction. A multi-ported changeover valve is provided for this purpose, as is also a high-velocity blowing nozzle.

Higher in the range of Davidson and Co. Ltd. vacuum equipment is this concern's Sirocco heavy duty portable pneumatic conveyancy unit; of interest, it is claimed, to the textile industry on account of its wide variety of applications and high standard of performance. It can be employed in the mill for the conveyance, collection and bagging of material, and also for auxiliary duties, such as the conveying of small coal to the boiler-house or the cleaning of Lancashire boiler flues; the latter operation is greatly facilitated by the equipment, thereby reducing the time that the boiler must be out of commission.

The unit is mounted on a wheeled chassis provided with castor steering and drag handle to permit easy manual haulage and manoeuvring and comprises a rotary exhauster of the constant displacement type, capable of establishing a high vacuum with a corresponding high degree of efficiency, and driven through vee-ropes by a 7½ b.h.p. electric or petrol motor. A large receiver is fitted complete with automatically controlled discharge valve for delivering the collected material into sacks or other suitable containers, thus eliminating the delay involved through stopping the plant to dispose of the accumulated material. A multi-sleeve fabric air filter with mechanically operated cleaning gear is incorporated in the receiver, whilst the filter cleaning mechanism and discharge valve are controlled by an automatic timing gear, driven from the exhauster shaft. The receiver and filter can be raised and lowered by means of a screw gear. They are raised to the working position to permit the attachment of sacks or for delivery of the material into bins, chutes, etc., and lowered for travelling.

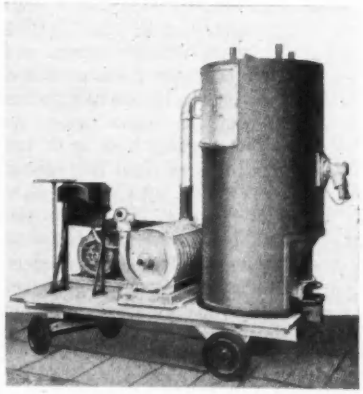


Fig. 27. Sturtevant industrial vacuum cleaners are designed for heavy duty and are available in a number of portable sizes. They are also available for central plant installations

Portable Equipment

In Fig. 27 is shown one of the portable equipments produced by Sturtevant Engineering Co. Ltd. These industrial cleaners are designed for heavy duties and are available in a number of portable sizes, culminating in the central or stationary plant. In the smaller portable machines of the range, the dust is received and filtered from the conveying air by a filter bag of woollen or equally suitable material located prior to the exhauster. The latter is always of the turbo-exhauster type consisting of two or more "stages" or fans in series according to the size of the machine, and capable of maintaining a negative pressure up to 10 ins. of mercury. The larger portable plants and the stationary "central" plants are equipped with steel settling chambers and cyclone collectors in addition to bag filters for collection of the dust.

Tellus Super Vacuum Cleaner Ltd. also specialise in the design and manufacture of portable suction cleaners suitable for use in textile mills and allied plants. Two of these equipments are shown in Figs. 28 and 29, these being, respectively, the

Tellus large capacity suction cleaner, Model T150 and the Model F120 industrial suction cleaner. The overall dimensions of the former are a width, length and height of 25 ins., 40 ins. and 40 ins. respectively and it weighs 152 lbs., exclusive of accessories. The entire unit, as shown, is mounted on a four-wheeled chassis; with the front wheels arranged to swivel.

With this design three suction units, mounted above the filtering machine in the top of the receiver, are employed and these have a power consumption of 1,350 watts. The steel container or receiver has a dust capacity of 7 cu. ft., and is fitted with a concertina-shaped dry-fabric type air filter extending across the length and breadth of the receiver in a position approximately midway between the suction inlet and suction units. The area of the air filter is very large, i.e. about 1,700 sq. ins., and as the dust is collected in a steel container the suction is practically unimpaired during use.

The Model F120 is a smaller size unit, having a container capacity of 2 cu. ft. It is fitted with two suction units in the top of the container, which have a power consumption of 950 watts. The Tellus principle of collecting dirt in the container is embodied in the design, so ensuring an undiminished suction, whilst the suction inlet to the container is fitted with a deflector which gives a cyclonic effect and protects the filter against grit and sharp objects. A large filtering area is again provided, i.e. 7 sq. ft., but in this case the filters, one for each suction unit, are not of the corrugated design, but are of the bag type mounted on formers and suspended from the top of the container; completely enclosing each suction unit. The dust-laden air thus impinges on the outside surface of the filters, is cleaned, and dust-free air is exhausted to atmosphere; the dust is retained within the container.

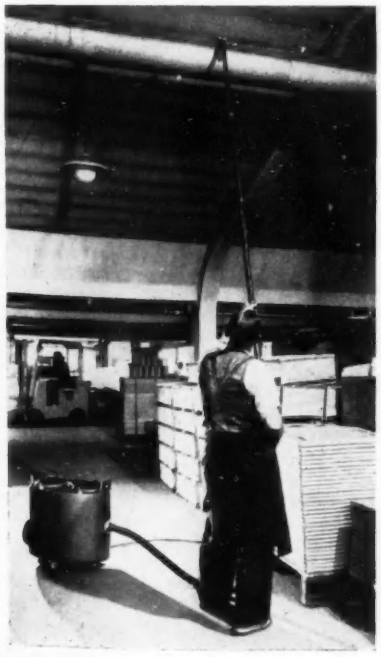


Fig. 29. The Model F.120 using one of a number of tool-heads specially designed for above-floor cleaning

The equipment is 17 ins. wide, 29 ins. long and 26 ins. high, and weighs, without accessories, only 62 lbs. Ease in manoeuvrability is assured by a four-wheeled mounting; that is, two fixed and two swivelling wheels, rubber-tyred and on ball bearings. These enable the Model F120 to turn within its own length, and to follow easily, even on uneven surfaces. As will be appreciated, many features are common to both machines, this applying in particular to fittings and accessories. Each is provided with an emptying device combining air-tightness with easy operation, whilst an airtight, quick-locking device permits rapid assembly of hose, tube and nozzles, or change of tools. A rubber ball socket connecting the ball sockets of the hose and curved tube prevents stiffness and kinking and the hose is connected to the container by means of an airtight bayonet socket and ball joint, which allows a high degree of movement.

A wide range of accessories, or tools, is available for cleaning floor areas, above-floor cleaning (pipes, beams, girders and beams), for machinery and for radiators and shelves. Additionally, special attachments are available so that the exhaust air from the suction units can be utilised for blowing and spraying. As large floor areas can be more quickly and effectively cleaned by a machine fitted with a fixed floor nozzle than with the normal hose, tube and nozzle, simply by pushing the cleaner across the floor at walking pace, this special accessory is available for converting each model, as indicated in Fig. 30, into a fixed nozzle machine. It can, of course, be quickly detached so that the machine can be used in the normal manner for walls, machinery, etc. Maximum suction, conforming with the surface traversed, is obtained by adjusting the distance between the nozzle and floor.

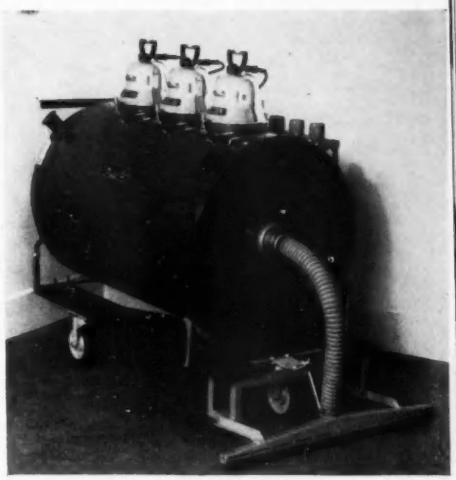


Fig. 30. When fitted with the special wide fixed floor nozzle and carriage both the Model T.150 and F.120 are prefixed with the letter "X" to differentiate them from the ordinary models with hose and cleaning tools

(concluded)

Fire Protection in Factory or Workshop

IT is now possible to locate an inexpensive fire fighting appliance beside each work-bench, machine or office desk to deal with minor outbreaks of fire instantly before they become major conflagrations. The Gwish aerosol fire extinguisher contains 12 fluid ozs. of extinguishing liquid, released as a powerful jet spray by depressing the discharge nozzle, release of the nozzle completely

cuts off the jet. The spray douses flames instantly and carries for 6 ft. with a 3 ft. dia. coverage. The extinguishing fluid used is a non-conductor of electricity. Gwish is sold in cartons of one dozen extinguishers, complete with fixing brackets at 12/11 per extinguisher, less usual trade discounts. Further details will be supplied by Deb Chemical Proprietaries Ltd., Belper, Derbyshire.

Assessing the Efficiency of Drying Cloths

THE essential requirement of a good drying cloth is that it should absorb water instantaneously from the surface of the article being dried so that each wiping stroke not only dries the surface but cleans and polishes it also. The Linen Industry Research Association, Lambeg, N. Ireland, has now designed a simple wiping test which it is claimed proves the outstanding superiority and quality of linen in the kitchen. The new testing instrument is capable of assessing the behaviour of a drying cloth during the first fractions of a second of contact with a wet surface. The test also stimulates the main characteristic of the drying and wiping actions encountered in practice. When water is absorbed by a linen towel it is absorbed by the fibres and locked away so that drying and polishing of the dish or glass is not hindered by the smearing back of moisture on to the surface of the article.

As will be observed from the illustration, the new device is a simple apparatus which looks like a safety razor sharpening stropper. Fig. 1 shows the carriage A which presses the test sample B against the ground glass plate C. Drops of tinted water of standard size are placed in five small depressions on the glass plate at D. In making the test, the carriage is drawn at a standard rate over the drops and along the glass in the direction of the arrows, and the instrument has a scale for reading-off the lengths of the water traces. Fig. 2 shows the water traces resulting from tests with drying cloths of high, intermediate, and low wipe-off efficiency.

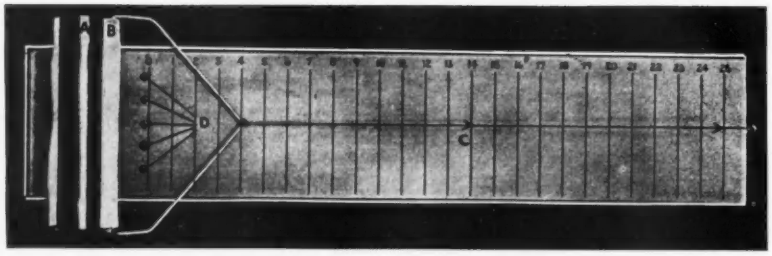


Fig. 1. Beginning of test with the "Linra" wipe-off testing instrument

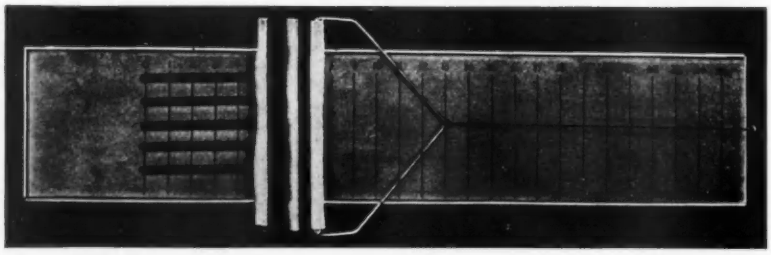


Fig. 2. View showing the carriage being drawn over the ground glass

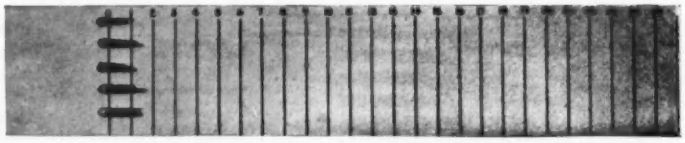


Fig. 3. Water traces resulting from test with cloth of high wipe-off efficiency

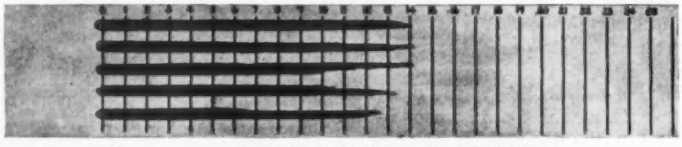


Fig. 4. Result of test with cloth of low wipe-off efficiency

New Zealand Floor Price for Wool

Floor prices for greasy wool offered at approved auction sales in New Zealand and the U.K. during the 1958-59 season, beginning on August 1, will be unchanged from floor prices for the previous season, states the New Zealand Wool Commission after consultations with the Minister of Agriculture and the New Zealand Wool Board. The average price in the 1957-58 season was 33d. per lb. Minor adjustments will be made for next season in the price relationship of certain types of clothing wools, average to inferior lambs, and inferior descriptions which, in the light of market experience during the previous season, were somewhat over-protected compared with other types comprising the great bulk of the clip. The effect of these adjustments on the overall average floor price will not be significant. In the absence of exceptional or unforeseen circumstances, the policy of the Wool Commission will continue to be to buy-in at floor prices all wool not taken by commercial buyers at above the floor prices.

Dress and Suiting Cloths

Photographed approximately a quarter larger than the original patterns for purposes of detail, the cloths on the facing page are a selection from the ranges of fine worsted cloths made by Leigh Mills Co. Ltd., 53 Leeds Road, Bradford. Brief details are as follows:

(1) 15663. An all wool 7/7½ ozs. cloth beautifully balanced in colour selection, weave and finish (54 ins. wide).

(2) D1517. A quiet, distinguished cloth with a neat, squared effect. All wool, it is 56/7 ins. wide and 15/16 ozs.

(3) 15678. Two wonderfully harmonising shades characterise this 54 ins., 9 ozs., all wool cloth.

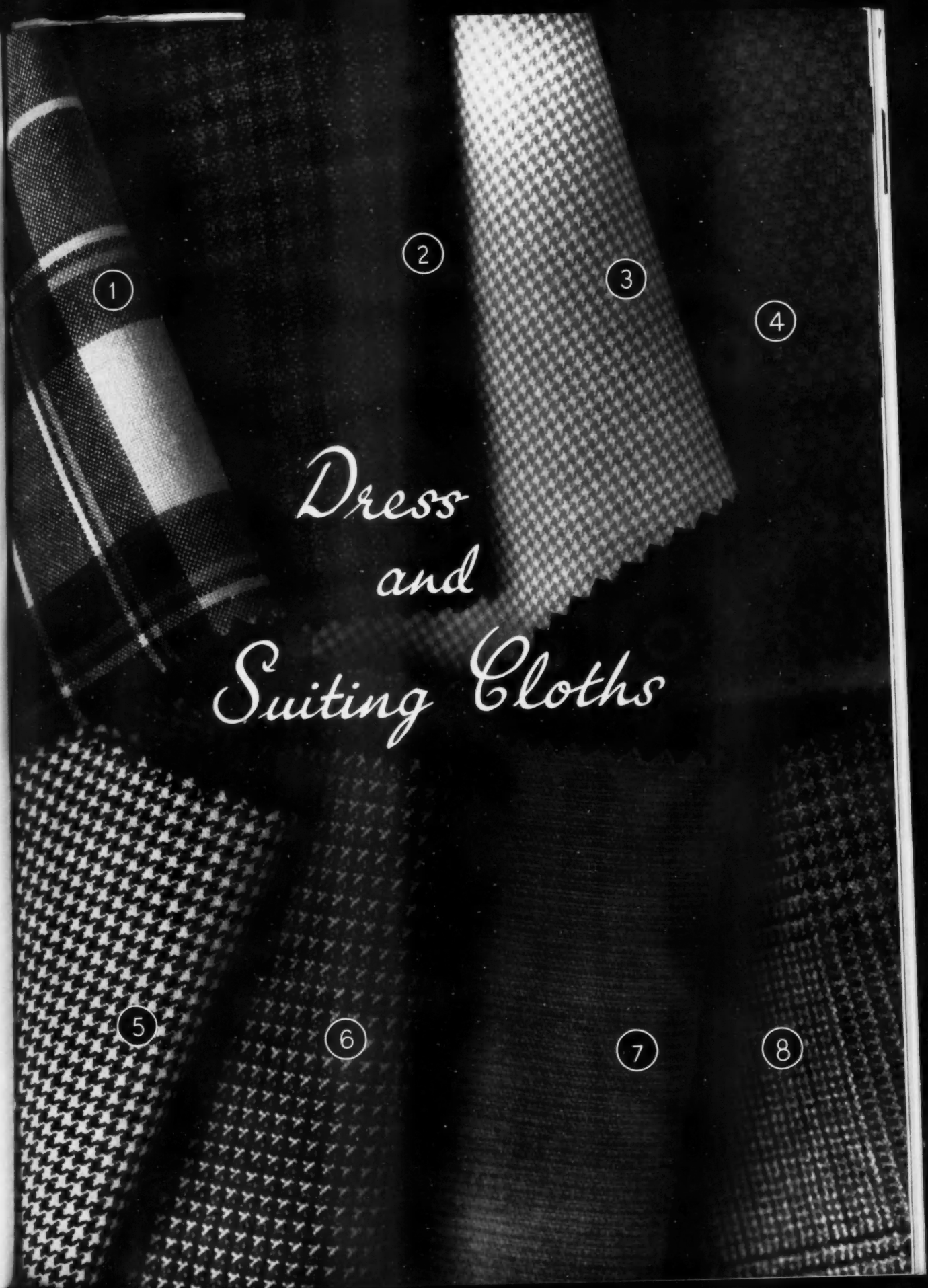
(4) 20021. An attractive weave and blue/green shade are the striking features of this 54 ins., 12½/13 ozs., all wool pattern.

(5) 15699. In black and white, this ever popular design is available in 9/9½ ozs., 58 ins. cloth; it is 55% "Terylene" and 45% wool.

(6) D1517. All wool pattern of smart design. It is 56/7 ins. wide, 15/16 ozs.

(7) 20022. A fine corded effect in a lovely green shade. All wool, it is 54 ins. wide and 12/12½ ozs.

(8) D1517. Quiet, checked cloth of handsome appearance. This also is wool, 56/7 ins., wide, 15/16 ozs.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Dress and Suiting Cloths
5
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7
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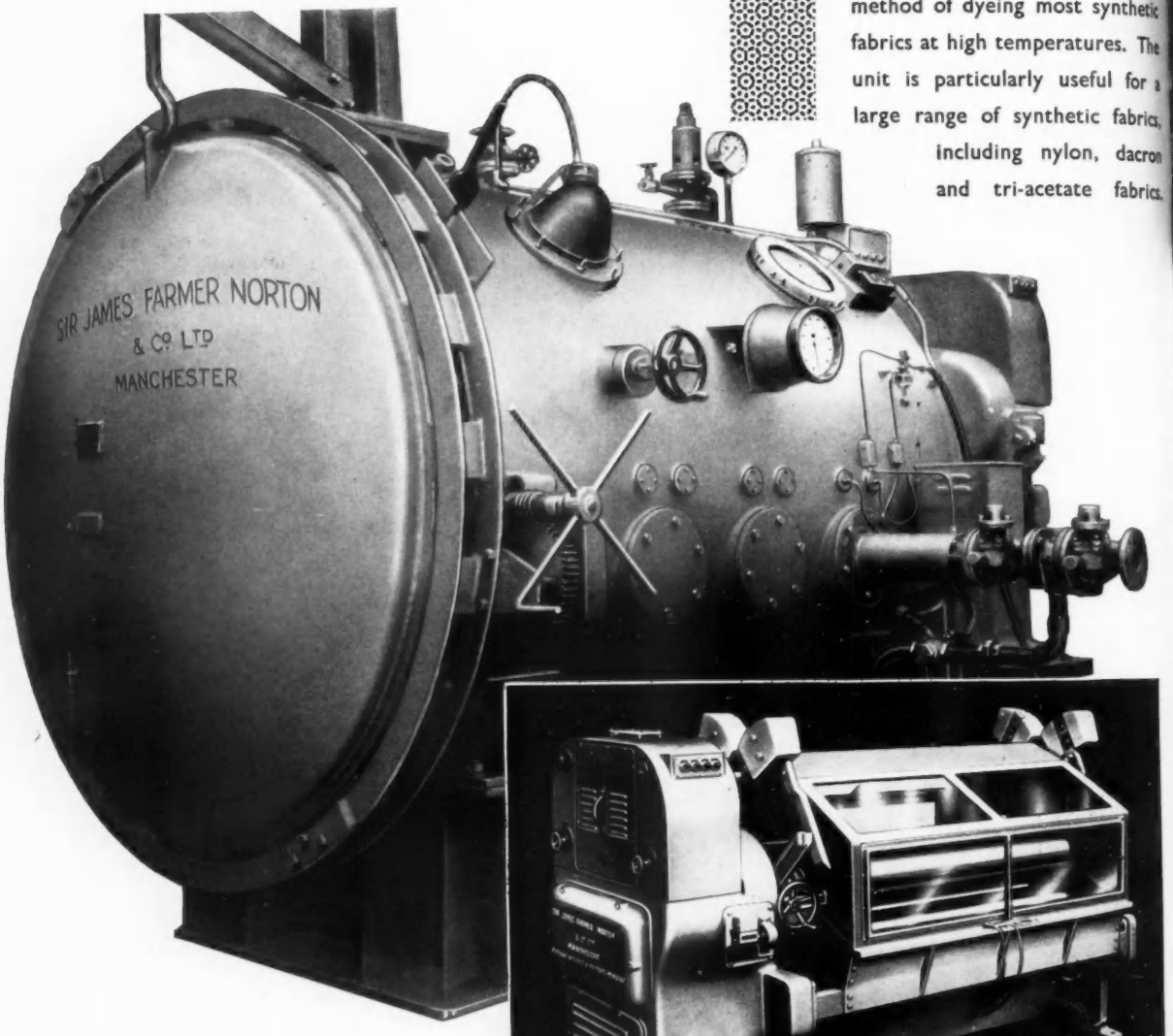
Introducing

The **NEW** Farmer Norton PRESSURE DYE JIGGER

We have devoted a considerable amount of research to perfecting the Farmer Norton Pressure Dye Jigger and can confidently claim that this machine is the most satisfactory and quickest known method of dyeing most synthetic fabrics at high temperatures. The unit is particularly useful for a large range of synthetic fabrics, including nylon, dacron and tri-acetate fabrics.



The fullest technical information together with illustrated literature will be supplied on request

ALL-ELECTRIC CONTROLLED TENSION JIGGER

For really accurate tension control, and specially for light tension working, this type of machine is without rival and several hundreds are now in operation.

SIR JAMES FARMER NORTON & CO. LTD.

ADELPHI IRONWORKS, SALFORD 3, LANCS.

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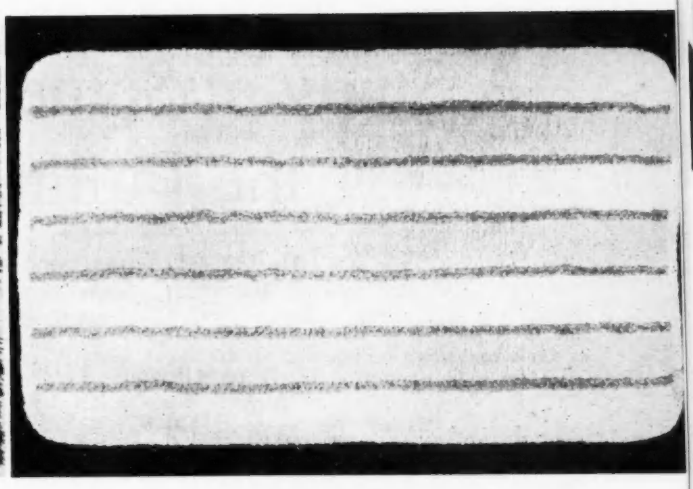
This looped pile scatter rug incorporates "Lurex" MF $\frac{1}{32}$ in. doubled with 3/3's spun viscose (silver "Lurex" on grey yarn) in the deeper pile relief areas. The remainder of the pattern is red



Aptly named "Midas' Touch" this new American bath mat by Martex uses "Lurex" MM $\frac{1}{32}$ in. gold yarns which add a luxury touch to the designs of pink and white stripes

Lurex in Tufted Carpets and Scatter Rugs

IN America the use of Lurex in tufted carpets, scatter rugs and bath mats is considerable, and increasing interest is being shown by the tufting trade in Britain in such applications. There is an important trend towards the use of Lurex in loop pile constructions. Up until now Lurex has mainly featured in cut pile constructions so far as scatter rugs and bath mats are concerned but the looped pile is considered the newer look. In many different bath mat styles two or three rows of looped pile Lurex MM $\frac{1}{32}$ in. gold separate coloured stripes or circles. A new bath mat line repeats such styling with a cut nylon pile; the Lurex MM $\frac{1}{32}$ in. is looped pile whereas the nylon is cut.

Two different types of Lurex are used in tufting. For the wide carpeting Lurex MF (Mylar foil) is recommended. Its use here is linked to the fact that much of the carpeting is piece dyed and for such processes Lurex MF gives a better performance than MM. Again for this type of work the $\frac{1}{64}$ in. width is considered more applicable than $\frac{1}{32}$ in.

Lurex MM $\frac{1}{32}$ in. is preferred for cut pile bath mats and scatter rugs. It is fairly slackly doubled (about $2\frac{1}{2}$ to 3 t.p.i. with the ground yarn) and because of its springiness and resilience seems to stand away from its doubling component in the actual pile. The $\frac{1}{32}$ in. width gives a very much bolder effect in the coarser, loftier cut pile lines than does the $\frac{1}{64}$ in. width. Another feature for MM in this role is its softness and pliability. It does feature in piece-dyed constructions, but tests are advisable before dyeing.

There are many different ways of doubling Lurex MM or MF with the tufting yarn but it should not be doubled too tightly ($2\frac{1}{2}$ to 3 turns is considered ample) and not to double the Lurex as the outside binder. This tends to constrict the yarn from bulking out and in cut pile work does not hold into the sheeting base as well as a yarn in which the Lurex is bound around with an outer ply. Twist and method of doubling is most important. The orthodox type of doubling is considered to give the best effect. Hollow spindle doubling has the effect of constricting the yarn and prevents it fulling out in the carpet pile.

This limitation applies equally well to cut pile carpeting, where the Lurex yarns have been cabled on to the outside of the yarn. Difficulty is encountered in binding the pile yarn into the hessian base. One typical rayon yarn for tufting is 2/2's count incorporating $\frac{1}{32}$ in. Lurex MM. All three plies are taken separately to the guide eye, the Lurex being fed in at a slightly higher speed than the two component plies. Another method is to first double the Lurex with one ply of yarn and to use a second ply as binder.

Both methods have been found to give good anchorage to the Lurex, an essential point for yarns which are required for cut pile effects. Singles yarns are used extensively in bedspreads and bath sets, typical counts ranging from ·95's to 1·25's c.c., with a twist factor of 8 t.p.i. "S" in the singles, doubled approximately $3\frac{1}{2}$ t.p.i. "Z" with the Lurex content.

Some difficulties have been encountered in doubled yarns due to kinking of the metallic content and applies particularly in cut pile effects. A means of obviating this is to insert twist in the Lurex yarn before doubling. One processor recommends 3 t.p.i. "Z" twist when using $\frac{1}{32}$ in. MM. This is then doubled with a 2/4's c.c. rayon yarn 3 t.p.i. "S" twist; all three components are then run in via the roller through the guide eye, and on to the flyer. This method, it is stated, produces a stable yarn.

An essential point in cut pile tufting is to avoid designs which have sharp turns, such conditions cause the Lurex to turn on its side and not be firmly secured. The American technique for over tufted swirl effects is to run a Lurex yarn along with another textile yarn through the same needle eye. In a two-needle machine, a coarse two-fold rayon yarn is used in one needle and in the other is fed a finer two-fold rayon yarn together with a doubled yarn containing Lurex yarn.

Considerable development work has been done in Britain with Lurex on various types of tufting machines manufactured by Cobble Bros. The types produced range from close looped pile carpeting suitable for contract work to scatter rugs with high and low pile forming sculptured effects. Both $\frac{1}{32}$ in. and $\frac{1}{64}$ in. MF yarns have been used in these trials, the finer width being reserved for looped pile carpeting and the $\frac{1}{32}$ in. width giving more of a show in the denser cut pile styles.

Lurex MF yarn may with safety be used in yardage tufted carpet which is to be piece-dyed. This facility permits endless scope in the contract furnishing field, where carpeting has to fulfil part of a colour scheme. The extensive range of shades in Lurex MF offers unlimited opportunities for creative colour effects. Gold and bronze are suggested for off-white grounds, while silver gives an interesting lift to black. Again with black there is a choice of emerald green, royal blue and scarlet and these shades can be used again for grounds that would be dyed to toning shades.

A Study of Some Factors Affecting the Pulling of Rags*

In this, the concluding part of the investigations, the authors discuss the effect of the percentage fibre in a shoddy on the strength of the spun yarn

(Continued from T.M. April, p. 176)

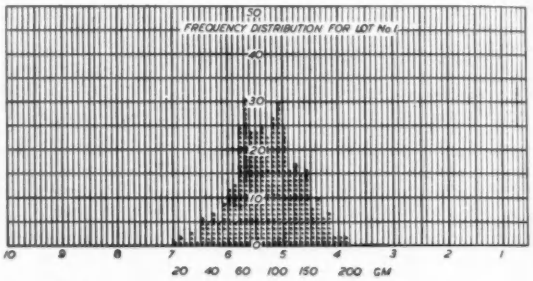
By C. D. MEYER and P. P. TOWNEND, B.SC., PH.D., F.T.I.

SINCE the ultimate object of rag pulling is to produce a shoddy which when carded and spun will give as strong a yarn as possible, it is then obviously of interest to enquire how the percentage fibre in a shoddy affects the strength of the yarn. To this end five experimental conditions were chosen which, from previous experiments, were known to give varying amounts of fibre in the shoddy. Fifty pounds of new light cheviot rags were oiled with an emulsion containing 15% oil and 15% water on the weight of rags and pulled on the same machine as before under the following conditions which gave, on analysis by the previously employed technique, the percentage fibre set out in the right hand column of Table 29.

Table 29

Lot	Swift speed r.p.m.	Feed roller speed r.p.m.	Teeth in swift	Rate of production lb./hr.	% Fibre in shoddy
1	428	16	9,360	326	76
2	428	6	9,360	122	81
3	570	9	9,360	91	86
4	570	9	23,000	366	89
5	570	6	9,360	244	95

The experimental conditions not tabulated are the constant ones given in Table 4 ("T.M.", Nov. 1957, page 554). Each sample was carded to 9 Y.S.W. on the 30 ins. wide Saxony woollen card consisting of a 3 part scribbler, 1 part intermediate, 2 part carder and a 4-height series tape condenser. The clothing ranged from 80/8/27 to 140/12/34. The worker settings to the swift on the scribbler were 22s to 28s gauge on the intermediate 26s to 28s and on the carder 28s gauge. The swifts revolved at 80 r.p.m. and the production was 11 lbs./hour. The "Peralta" rollers after the last swift in the scribbler were set at 2,000 lbs. pressure. The condensed slubbing was then spun on a mule to 12 Y.S.W. with 10 T.P.I., and the resultant yarn tested for strength and elongation on the "Uster" yarn strength tester. The results obtained are given in Table 30.

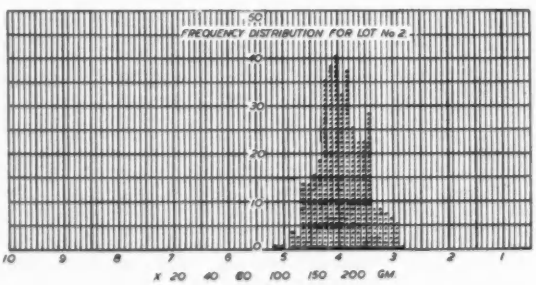


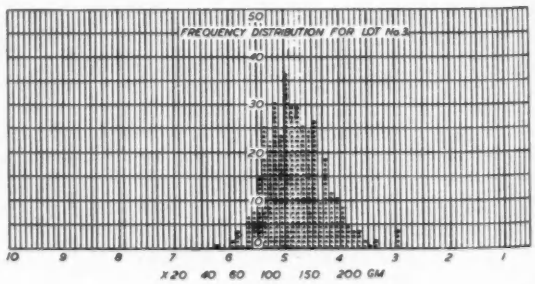
The momentary measuring range is 1,000 for every lot, except Lot No. 2, which has 1,500

Table 30

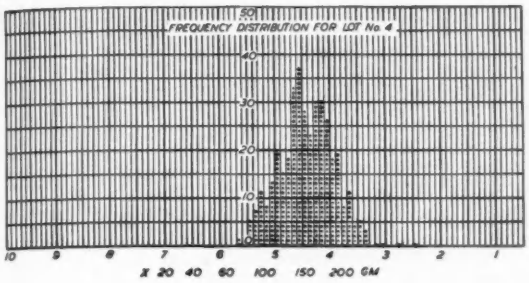
	Lot 1	Lot 2	Lot 3	Lot 4	Lot 5
% fibre in shoddy ..	76	81	86	89	95
Mean strength (gm.)	526	585	476	453	439
Standard deviation (gm.)	60	66	51	64	52
% co-efficient of variation	11·4	11·3	10·7	14·1	11·8
Standard error (gm.)	±3	±3·3	±2·55	±3·2	±2·58
% mean elongation	10·4	13·3	13	13·1	11·6
Total No. of readings ..	400	400	400	400	400

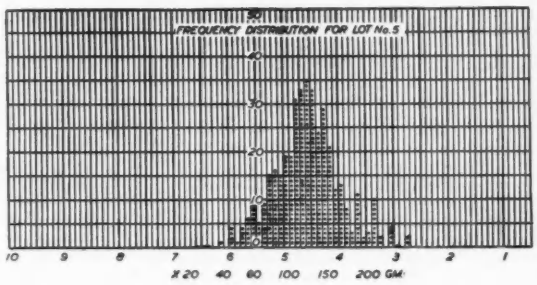
Table 30 gives details of the yarn strengths which are significantly different from each other. The frequency distributions on the diagram papers for the different yarns give some idea of the spread of the breaking loads. From Table 30 and Graph 3 it is evident that a variation in the percentage fibre content of the shoddy can influence the strength of the resulting yarns. The lowest percentage fibre content was 76 and the yarn produced from this shoddy gave a mean strength of 526 gms. By increasing the percentage fibre content



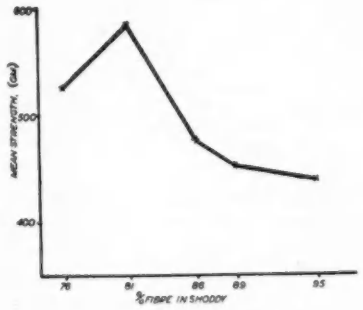


* *An account of some original research work carried out in the Department of Textile Industries, University of Leeds.*





to 81 it will be seen that the yarn strength increased to 585 gms. (11%) indicating that an excessive amount of thread in a shoddy will produce a weaker yarn compared with one which contains less thread. But it will also be observed that further increases in percentage fibre from 81 to 95 caused a decrease in the strength of the resulting yarn, viz. 585 to 439 gms., which suggests that a more severe grinding action reduced the fibre length of the shoddies and this in turn weaker yarn.



Graph 3

Summary and Conclusions

The aim of this thesis was to examine how some factors which operate in rag pulling affect the percentage bits and fibre in the resulting shoddy made from new light cheviot rags. A further object was to demonstrate the effect of the latter on yarn strength and the following were some of the factors investigated:—

(1) Effect of swift speed.
(2) Effect of feed roller speed.
(3) Effect of feed roller diameter.
(4) Effect of feed roller setting.
(5) Effect of swift population.
(6) Effect of bit roller setting.
(7) Effect of bit box slide setting.
(8) Effect of rate of production.

So far as the rag bits in the shoddy were concerned the following conclusions can be drawn from the work:—

(1) An increase in the swift speed from 428 to 570 r.p.m. will give less bits in the shoddy, but a further increase to 750 r.p.m. will again yield more bits.
(2) An increased feed roller speed from 6 to 9 and 9 to 16 r.p.m. will lead to an increase in the weight of rag bits.
(3) A wider feed roller setting will give an increase in the weight of rag bits.
(4) A smaller feed roller diameter will possibly yield a decrease in the weight of rag bits. The evidence in this experiment was not very conclusive.
(5) A more densely populated swift has no marked effect on the weight of rag bits.
(6) An increased opening of the bit slide will yield a decrease in the weight of rag bits.
(7) A wider bit roller setting will result in a decrease in the weight of rag bits.
(8) A decrease in the rate of production will result in a decrease in the weight of rag bits.

So far as the percentage fibre in the resulting shoddy is concerned the following conclusions can be drawn—

Swift Speed.—One will obtain less fibre at a low swift speed (viz. 428 r.p.m.), but a 33% increase (to 570 r.p.m.) will bring about an increase in fibre content although a further increase (570 - 750 r.p.m.) has no apparent effect on the composition of the shoddy.

Feed Roller Speed.—Small variations in feed roller speed (6 to 9 r.p.m.) seem to have no effect on the composition of the shoddy, but more marked differences (6 to 16 r.p.m. and 9 to 16 r.p.m.) will give a decrease in fibre content.

Feed Roller Setting.—Considering only two feed roller settings, viz. $\frac{1}{4}$ in. and $\frac{1}{2}$ in. then the latter will bring about a decrease in the percentage fibre in the shoddy.

Feed Roller Diameter.—The actual decrease in fibre content from one feed roller diameter to another, $2\frac{3}{8}$ - 2 ins., was so small that this particular difference had no significant effect so far as the percentage fibre was concerned.

Population of Swift.—One will obtain less fibre with a small number of teeth (viz. 5,850) but a 60% increase in swift population will bring about an increase in fibre content although a further increase from 9,360 to 23,000 teeth had no apparent effect on the composition of the shoddy.

Bit Box Slide Setting.—On the whole, it would seem that an increased area of opening (from closed to 219 sq. ins.) will yield an increase in the fibre content.

Bit Roller Setting.—On the whole, it would seem that a wider bit roller setting will not influence the percentage fibre in the shoddy.

Rate of Production.—On the whole, it would seem that a lower rate of production will not influence the percentage fibre in the shoddy.

So far as fibre content and yarn strength are concerned it would seem that a variation in the percentage fibre content of the shoddy can influence the strength of the resulting yarns. The lowest percentage fibre content was 76 and the yarn produced from this shoddy gave a mean strength of 526 gms., by increasing the percentage fibre content to 81 it was shown that the yarn strength increased to 585 gms. (11%) indicating that an excessive amount of thread in a shoddy will produce a weaker yarn compared with one which contains less thread. But further increases in percentage fibre from 81 to 95 caused a decrease in the strength of the resulting yarn, viz. 585 to 439 gms. which suggests that a more severe grinding action reduced the fibre length of the shoddy and this in turn led to weaker yarn.

References

(1) N. C. Gee, F.T.I., "Shoddy and Mungo Manufacture." (Emmott and Co. Ltd., Manchester.)
(2) S. W. North, Diploma Thesis, Textile Department, University of Leeds, 1953.

The "Clean-O-Matic" Blowroom*

One of the latest developments in blowroom construction and technique, the "Clean-O-Matic" line, introduces automation into the blowroom. It is built round a basic line of machinery consisting of the "Tweedales-Shirley" hopper, "Shirley" opener, reserve feed and scutcher. The line can be extended by the addition of blending feeders, bale breakers, the S.R.R.L. "Revolution" opener and hopper feeders

THE "Clean-O-Matic" blowroom, recently announced by Tweedales and Smalley Ltd., Castleton, incorporates some of the best scientific knowledge and engineering skill available to the cotton industry today. In the development of the "Clean-O-Matic" blowroom, a large measure of collaboration between the scientists of the British Cotton Industry Research Association and the company's technicians has resulted in the incorporation in the "Clean-O-Matic" blowroom of the "Shirley" wheel in place of the normal type of condensers, the "Shirley" beater compartment, and the "Tweedales-Shirley" hopper. This last machine was developed and built as a joint project between Shirley Institute and Tweedales.

The "Clean-O-Matic" blowroom is built round a basic line of machinery which consists of the "Tweedales-Shirley" hopper, "Shirley" opener, reserve feed and scutcher. The basic line can be extended by the addition of blending feeders, bale breakers, the S.R.R.L. "Revolution" opener, and hopper feeders. These machines are all part of the "Clean-O-Matic" blowroom.

Better Opening.—This is achieved by combinations of the new blending hopper, the S.R.R.L. revolution opener, and the "Tweedales-Shirley" hopper with its special double beater compartment.

Better Cleaning.—The pre-cleaning of the "Tweedales-Shirley" hopper coupled with the "Shirley" opener and the new scutcher, give better cleaning with lower lint losses.

Better Blending.—In addition to the new blending hoppers, the S.R.R.L. machine and the "Tweedales-Shirley" hopper both give better and more intimate blending. In addition, the special Kirschner of the "Shirley" beater compartment is said to produce the most intimately blended lap yet produced.

Better Lap Regularity.—The introduction of the basic line wherein the material being processed is maintained in accurate balance over the full lap width, from the "Tweedales-Shirley" hopper forward, has resulted in considerably improved lap regularities. On a test in a Lancashire mill of over 1,000 consecutive laps the coefficient of variation of the laps was 0·9 - 1·4%.

Better Dust Removal.—The use of high speed cages in the "Tweedales-Shirley" hopper and the "Shirley" opener results in better dust removal, giving cleaner blowrooms and less dust problems at the cards.

Automation.—In the "Clean-O-Matic" blowroom line, the scutchers are provided with fully automatic doffing devices; waste removal from all machines is carried out automatically and the lubrication of moving parts is by one-shot oiling system. Automatic control of feeding, and the stopping and starting of each individual machine in the line, is achieved by a greatly improved system of electrical control, incorporating snap-lock switches and electro-magnetic clutches, in place of the mercury switch and belt-moving solenoid.

Space Saving.—The basic line takes up only 49½ ft. by 7¼ ft. and is claimed to achieve more concentrated opening and cleaning within this space than any other line.

Easier Cleaning and Maintenance.—All the machines are completely enclosed in sheet metal panels. All change wheels are easily accessible, and special attention has been given to the ease of removal of parts for maintenance. Wherever possible, individual parts of different machines have been standardised in order to reduce the number of components mills will normally carry as spares.

Improved Engineering Design.—All the machines are manufactured to machine tool tolerances. All fast revolving parts run in ball bearings or needle bearings; all shafts which run in needle bearings are case-hardened.

Basic Section

At the outset, when designing the "Clean-O-Matic" blowroom, the makers conceived it as an entity and not as individual machines. The machines which make up the "basic line" are (*a*) the "Tweedales-Shirley" hopper, (*b*) "Shirley" opener, (*c*) reserve feeder, and (*d*) scutcher. It was the intention that, where possible, each machine should have a specific function in the process. The two main aims were to obtain maximum lap regularity and maximum cleaning.

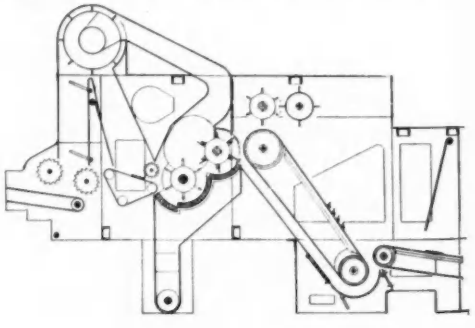
Lap variation is due, of course, to a varying number of fibres in the cross-section of the lap. Thus, it is impossible to obtain a regular lap unless the cotton is thoroughly opened, because if the tufts of fibre are larger it is more difficult to distribute them easily. Similarly, it is far easier to remove trash from the stock when it is not imprisoned in balls of unopened cotton.

Tweedales were fortunate, therefore, in that from the start they possessed the right machine for both jobs in the "Shirley" opener, and a "Clean-O-Matic" line is based on this machine.

Opening depends on three main factors:—

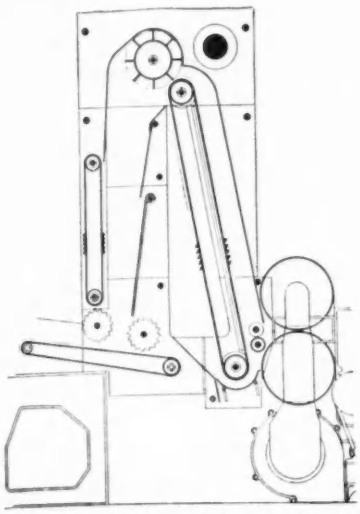
(1) Type and speed of the beater.
(2) Type of feed system.
(3) Conditions of feeding.

The beater in the "Shirley" opener is taker-in type with a special rake of saw tooth. 15⅝ ins. dia. it revolves at 1,560 r.p.m. and has a tooth density of 24 per sq. in. The high degree of opening gives the trash a chance of being rejected, which it cannot have if imprisoned in tufts of unopened cotton. Separation of lint from the trash is accomplished by their difference in buoyancy in an air stream. The beater strikes the cotton from a spring-loaded feed pedal system and takes it round



Section through "Tweedales-Shirley" hopper, showing beater section and reserve feed arrangement

* "*Globe Review*," *Vol.* 3, *No.* 2.



Section through reserve feeder, showing enticing rollers and "Shirley" opener cages

in a curved air stream caused by its own speed. Thus, a high centrifugal acceleration acting on the particles has the effect of segregating the trash and the lint by spreading out their respective paths. Beneath the beater is a boundary sheet with a specially shaped separation edge easily adjustable. The separation edge skims off a controlled amount of the loaded air stream so that all material passing outside the edge itself is rejected and all passing inside is delivered. Control over the amount of droppings is obtained by varying the settings of the separation edge to the beater. The stock is drawn by two fans, on both sides of the machine, on to cages revolving at 60 r.p.m. which are also an aid towards removing dust from the cotton.

Presentation of the material to the beater is important with any opening machine, but in the case of the "Shirley" opener it is vital. To avoid the necessity of the machine having to do the job of a bale breaker the stock must be given sufficient pre-opening by preceding machines. Of course, the amount of pre-opening depends on the type and grade of cotton and density of the bale. In the past T. and S. have advocated the use of two hopper openers and, when necessary, porcupine or crighton openers. Now, after much combined research with the Shirley Institute they have perfected the "Tweedales-Shirley" hopper which has become an integral part of the "Clean-O-Matic" blowroom.

Features of the New Hopper

The "Tweedales-Shirley" hopper is designed to open and clean cotton which has passed through a previous machine and to deliver a level controlled amount of stock to the lattice of the following machine. A hopper section, equipped with all the new developments peculiar to the "Clean-O-Matic" Hopper machines, feeds the cotton to an upright lattice from which it is removed by a spiked wiper roller and allowed to fall into a specially designed beater section. This is the principal element of the "Tweedales-Shirley" hopper and consists of two spiked rollers operating with fixed grid bars in a controlled air stream. The stock passes into the working sphere of the beaters without being struck from a nip point; an important factor when considering nep formation and fibre damage. Instead of the rigorous beating the cotton is subjected to a gentle buffeting action by the spiked rollers operating over the fixed section of grid bars. Strips of leather are located between each line of spikes on the first roller to create air currents to assist the action of the beaters on the material. The beaters containing the spikes revolve at different speeds. The first one fitted with leather strips at 600 r.p.m. and the second at 800 r.p.m. This is sufficiently slow to avoid damage or curling of the fibres, and yet the relative difference in peripheral speed affords a very effective opening action on the stock as it passes through this zone.

The action between the beaters and grid bars continues until the material fed is sufficiently open to pass to a revolving cage of perforated sheet metal, which is fitted at the top of the machine and is supplied by a trunk arrangement. The fan is so adjusted that not until the stock is sufficiently opened will it come under the influence of the air stream and pass through the trunking to the cage. This ensures maximum cleaning and the presentation of a well-opened feed to the "Shirley" opener, allowing maximum efficiency of operation.

The reserve delivery chamber is an important feature of the "Tweedales-Shirley" hopper. It maintains a regular constant feed to the beater of the following machine—which is important enough for the conventional machine but is a primary requirement for the "Shirley" opener. The feed for the "Shirley" opener, should be thick and slow, but regular across the whole width of the machine, and this regular feed is ably provided by the reserve delivery chamber. More than twice the size of the conventional one it is based on the principle of gravity feed and ensures that a constant head of material is kept in the chamber. It is provided with an overflow arrangement so that any material in excess of that required may be carried away and re-presented to the air stream.

The machines can be supplied in widths 38, 41, 46 and 49 ins. and the production for what may be termed the standard machine, i.e. 41 ins. wide, is sufficient for two scutchers: approximately 650 - 700 lbs. per hour. Since it will, in the majority of cases, be required to feed the "Shirley" opener the production is quite adequate. The feed to the "Tweedales-Shirley" hopper can be:—

(1) By hand on to an extended feed lattice.

(2) By a trunk feed arrangement through the medium of a "Shirley" wheel, which would deliver straight into the hopper.

(3) Direct from a previous machine, usually a hopper bale breaker, which to save space can be bolted to the "Tweedales-Shirley" hopper.

Delivery from the machine is always direct on to the feed lattice of the following machine which may be a "Shirley" opener, single porcupine, horizontal opener or a scutcher.

The cleaning capacity of the "Tweedales-Shirley" hopper is such that it has been necessary to introduce a revolving scroll beneath the beater undergrids to remove the droppings to the side of the machine from where it can be taken pneumatically to a special waste collector unit. This scroll arrangement has been used for several years now on the "Shirley" opener with great success and has been very effective in facilitating maintenance in the blowroom. Moreover, dust is extracted from beneath the upright lattice grid by a pipe exhausting to the waste collector unit.

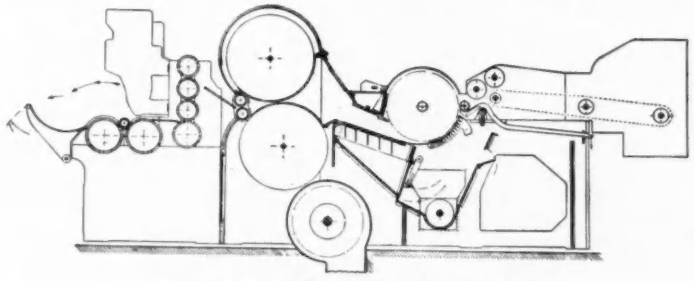
The Reserve Feeder

The main development in this field had been the fitting of a reserve box which, by keeping a reserve supply of cotton, ensured that the feed to the beater was constant and regular. As this had not been entirely satisfactory Tweedales designed a reserve feeder which maintains the principle of gravity feed. In the original "Shirley" opener line the cotton was delivered from the high speed cages either pneumatically by cage delivery and fan or by "Shirley" wheel to a double bin hopper feeder or by chute into a single bin hopper feeder. It was felt that here was a good opportunity to provide a machine which would give a regular feed to the scutcher. The opening action of a hopper machine is not required following the "Shirley" opener, and the reserve feeder gives the high degree of levelness which is so important.

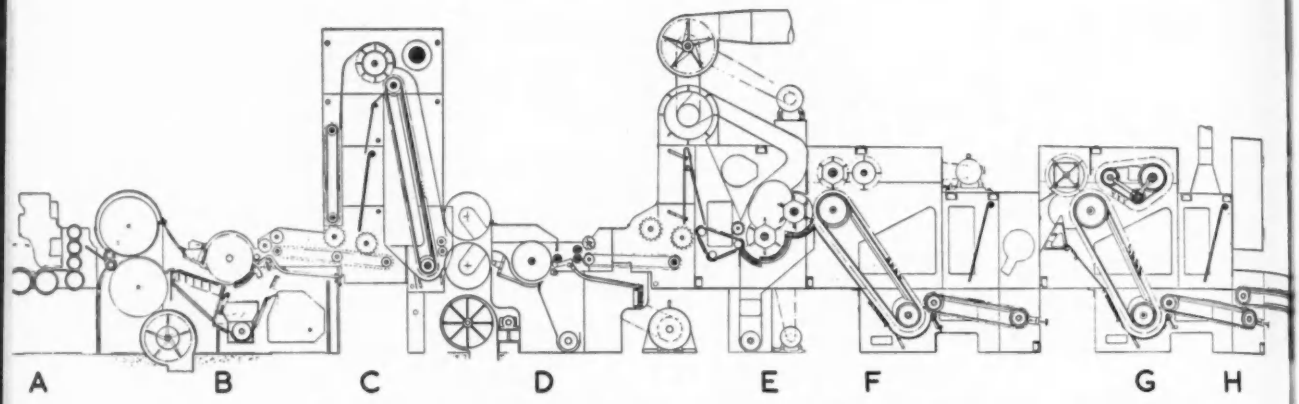
In the new reserve feeder a pair of wood enticing rollers receive the stock direct from the cages of the "Shirley" opener and deposit it on a spiked upright lattice. A stripping roller located at the top of the lattice then deposits the stock in a tall reserve bin, the height of which can be adjudged from the fact that the machine itself is 10 ft. high.

Because cotton processed through the "Shirley" opener is always so well opened that there is much bulk without weight, it was found necessary to introduce a press lattice fitted vertically at the front of the bin which has the function of pulling down the cotton and compressing it slightly to impart some density to it. Naturally enough, the press lattice is not fitted with spikes and consists of plain wooden lags fixed 3 ins. apart on a strong canvas backing.

The amount of material in the reserve bin is correctly maintained by a simple electrical control system. A swing door,



Section through T and S scutcher, including scroll arrangement under beater



"Clean-O-Matic" blowroom. Basic section plus bale opener. A—automatic lap doffer. B—scutcher. C—reserve feeder. D—"Shirley" opener. E—"Tweedales-Shirley" hopper beater section. F—"Tweedales-Shirley" hopper. G—bale opener. H—control panel

high in the reserve delivery bin, actuates a micro-switch controlling the electro-magnetic clutch on the "Shirley" opener, while a guide plate, which is adjustable according to the volume of material passing through, is fitted to the lower part of the reserve delivery bin. The press lattice is controlled by an electro-magnetic clutch operated by a micro-switch on the scutcher drop lever, or in the case of the automatic lap doffer, by means of a long overtravel micro-switch fitted on the belt shift mechanism.

An advantage of the reserve feeder is that, since it does not possess a hopper section it is only approximately 3 ft. 4 ins. long, which is important in efforts to reduce the floor space required by a blowroom line. The machine is driven by a separate motor situated at the top right-hand side.

The Scutcher

The cotton presented to the scutcher is in a superbly open state and the feed is regular across the whole width of the machine. The fundamental construction of the T. and S. scutcher has been retained in the new design, but several new features combine to ensure that a very regular lap is obtained. In spite of the efficiency of the high reserve feeder it was felt that the conventional tripod regulating motion, should be retained as an additional safeguard against irregularity. The three-bladed beater is also retained. "Shirley" lap felters, now a standard fitment on T. and S. scutchers when a "Shirley" opener is in the line, have proved very successful.

Automatic Lap Doffer

All T. and S. scutchers can now be fitted with their automatic lap doffer, designed to eliminate the necessity for stopping and starting the scutcher after the completion of a lap. These interruptions to the feed and delivery cause the cotton to build-up on the cages and, through the formation of thicker fleece, to create a certain irregularity in the first yard or two of lap delivered. A further irregularity can be caused at the completion of the lap due to it being allowed to revolve under pressure if the tenter does not remove it immediately. This action tends to stretch the outer layers.

The introduction of fully automatic doffing has eliminated the possibility of these sources of lap irregularity arising, because, since the feed and delivery sections of the scutcher are allowed to continue running, lap formation continues whilst the completed lap is being doffed. The doffing cycle is completed in 4 - 8·4 secs., depending on the rate of production required, and lapping continues without interruption. Moreover, since the scutcher now runs continuously, the production is increased. There is also less likelihood of laps being rejected due to incorrect weight; larger work loads can also be given to each operative, and automation in the blowroom is almost complete.

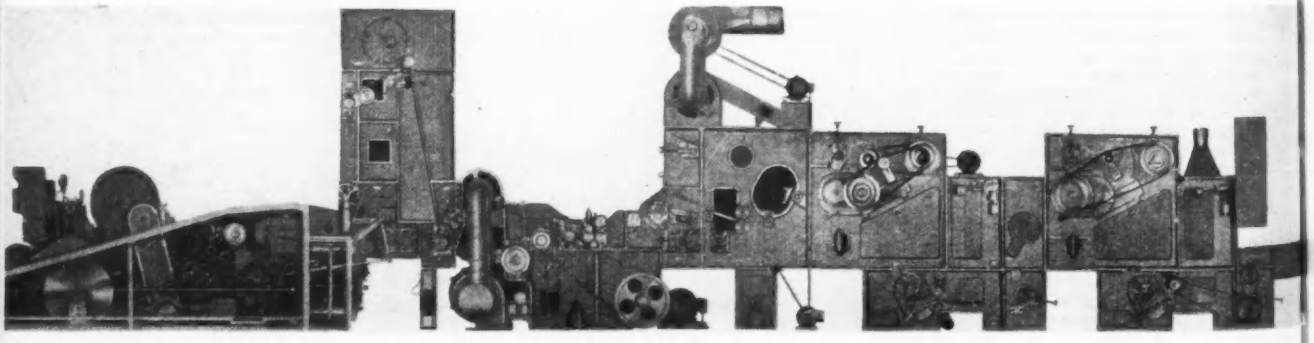
Another development on the "Clean-O-Matic" scutcher is the introduction of a revolving scroll beneath the beater. This arrangement functions in the same manner as that on the "Shirley" opener. The droppings are removed pneumatically from the side of the machine to a specially designed waste collector unit from which they can be easily collected in a bag.

Special sheet-metal covers in the form of doors hinged down the length of the machine totally enclose the gearing on all the "Clean-O-Matic" machines. These covers are designed to prevent the entry of dirt and fly and also to improve the safety factor. The whole of the "Clean-O-Matic" blowroom has been designed to reduce cleaning to a minimum.

All "Clean-O-Matic" machines, hoppers and scutchers alike are equipped with a pressure lubrication system. The system is simple, for by the operation of a single lever once per shift, the whole machine can be instantly lubricated. The tedious over-frequent manual lubrication of conventional systems is eliminated. A controlled amount of lubricant is delivered to each lubrication point as and when required.

Preliminary Opening Units

The hopper bale breaker is still an essential unit in the blowroom with the object of opening baled material in preparation for cleaning by beaters. This is particularly important when unconventional machines, such as the "Shirley" opener, which require a high degree of pre-opening, are in use. The new hopper bale breaker has been specially designed for this purpose and is manufactured 38, 41, 46 and 49 ins. wide between the frame sides. The main bottom horizontal lattice and the spiked upright lattice have been retained, but the old type evener lattice has been displaced by a spiked



Scutcher | Reserve feeder | "Shirley" opener | "Tweedales-Shirley" hopper | Hopper bale opener

"triangular" evener lattice. This new type allows a better and closer intersection with the spikes on the upright lattice, thus giving a much better opening action on the heavy tufts of fibre. All the lattices are easily adjustable for tensioning purposes and the setting between the evener and upright lattice can also be adjusted to vary the degree of opening as required.

The drive to the upright lattice is controlled by a Warner electro-magnetic clutch which stops and starts the drive through the control from subsequent machines. Similarly, an electro-magnetic clutch is fitted in the drive to the feed lattice (or the trunk feed spiked roller, wherever this arrangement is employed), and stops and starts these parts under the control of a B.S.A. snap lock switch operated by the swing door on the bale breaker bin. The belts and ropes, which have been an integral part of the drive since the inception of the hopper type machine, have been replaced entirely by "V" belts and chains, which give a much superior positive drive. All the gearing is totally enclosed by sheet metal covers.

The bale breaker has a production of some 900 lbs. per hour and can be arranged to deliver either:—

(1) Direct to a subsequent machine.
(2) On to a conveyor lattice.
(3) Into a mouthpiece for pipe delivery.

Normally it would be used in conjunction with a short basic "Clean-O-Matic" line and would feed direct into the bin of a "Tweedales-Shirley" hopper. In order to save space, if necessary all "Clean-O-Matic" machines can be bolted together. They are also so arranged that all the basic Hopper frame sides are interchangeable.

Hopper Blenders

In the modern cotton mill the use of blending hoppers is becoming a standard process because of the increasingly large numbers of bales in the mixing. These machines with their low production rate are designed to pull the cotton into small tufts, and by arranging to feed from a number of these hoppers a much greater spread of cotton is achieved ensuring a maximum fibre distribution and an intimate mix. The hopper blender is normally manufactured 30 ins. wide and whilst the production of the machine may be varied according to requirement the production rate recommended is 200 - 250 lbs. per hour.

The machine is of exactly the same construction as the bale breaker, apart from the narrower width and lower production. The "triangular" evener lattice is one of the most important features because the closer intersection of the spikes and better combing action permits the baled cotton to be opened into smaller tufts and thus makes for better blending.

The production rate is adjusted by means of a 3-step vari-speed unit. Control of the production rate is, of course, very important, because when a number of blending hoppers are in use it is essential that each unit should be regulated to give a desired quantity of cotton. The 3-step vari-speed unit is able to achieve this without affecting the degree of opening.

For a battery of up to four blenders T. and S. recommend delivery by mouthpiece into a common pipe for pneumatic delivery to the following machines. From their experience, this system gives better blending; but for mills which require a higher production with more than four blenders, delivery on to a conveyor lattice is to be preferred. A dust hood can be fitted over the bin and is recommended when feeding into piping. When delivering on to an open conveyor lattice a further dust hood at the front of the machine is recommended. The Sturtevant fan which exhausts the dust would blow into a Northmoor rotary filter unit.

The upright and feed lattices are controlled by Warner clutches, and the drive is by a British Standard motor mounted on slide rails on the machine in the manner which is standard on "Clean-O-Matic" hoppers. The motor drives by a flat belt to a pulley on the Vandyked stripping roller shaft. If the machine has a feed lattice more than 12 ft. in length, then the lattice is driven by a separate motor through an electro-magnetic clutch coupling and a Holroyd underdriven gear reduction unit.

Hopper Openers/Hopper Feeders

These machines are manufactured 38, 41, 46 and 49 ins. between frame sides. They provide the function of opening the cotton further and delivering a regular controlled amount to the machines following in the line. They may be fed by extended feed lattice, by pneumatic means through a "Shirley" wheel and trunk feed arrangement, or direct from the hopper bale opener. On these machines the normal type evener lattice is retained because, since normally there has already been a certain amount of pre-opening before the cotton reaches the hopper opener/feeder, either at the bale opener or blender, the combing action of the "triangular" type lattice is not necessary.

The reserve box has been enlarged to allow a capacity almost equal to that of the "Tweedales-Shirley" hopper. Using the principle of gravity feed the reserve box ensures a regular feed to the lattice of the next machine, and provision is made for surplus material to overflow down a reserve chute back into the bin. All lattices are adjustable for tensioning purposes, and, of course, the pitch of the spikes on the lattices will vary according to whether the machine is to function as an opener or a feeder.

Revolution Opener (S.R.R.L.)

Should the bales be so dense or the cotton so dirty that the pre-opening given by the "Tweedales-Shirley" hopper is not sufficient, the "Revolution" opener (S.R.R.L.) may be employed which, although primarily intended as an opener and blender, also achieves a certain amount of cleaning. This opener is based on the principle of imparting momentum to a large mass of loosely restrained cotton and then plucking out small tufts of fibres at a rate which avoids fibre damage and ripping of the cotton. The "Revolution" opener embodies a travelling lattice hopper which feeds the cotton in a circular mass or ball to five pairs of saw cylinders and doffers. These work in conjunction with a "kicker" cylinder which, with the rapidly moving lattice plus a series of scientifically designed cotton deflectors and air flues, cleans, blends and opens the cotton fed to a fluffy condition. Each saw cylinder is 12 ins. dia. and is covered with saw tooth wire and revolves at 400 r.p.m. The doffers, which are 9 ins. in diameter, grooved and covered with card type taker-in wire, revolve at double the speed of the saw cylinders plus 100 r.p.m.

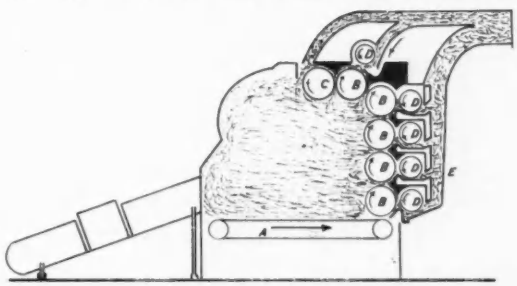
Although the S.R.R.L. is primarily an opener, it is to be noted that quite a large percentage of the heavier impurities fall out of the opened cotton into a collecting tray under the machine. Moreover, the complete opening action of the cylinders and the simultaneous plucking of tufts of fibres from five different parts of the revolving mass, make the machine an ideal blending unit for cotton and other fibres, and many firms in the U.S.A. use the machine solely for the purpose of blending fibres to colour patterns.

The "Revolution" opener is manufactured in three sizes with productions of 1,200, 2,000 and 2,400 lbs. per hour, which is sufficient for a large-sized mill; but, nevertheless, there is no sign of fibre damage or nep, and little or no trace of lint in the waste extracted. In "Clean-O-Matic" blowroom lines the "Revolution" opener would be used when a greater pre-opening capacity than that possessed by the "Tweedales-Shirley" hopper is required, and it is regarded as complementary to, and not a substitute for, this machine.

"Clean-O-Matic" Blowroom Layouts

When proposing blowroom installations for various cottons Tweedales and Smalley will rely in the main on the machines termed the basic "Clean-O-Matic" line, i.e. "Tweedales-Shirley" hopper, "Shirley" opener, reserve feeder and scutcher. Thus, the production which can be expected from a line will be dependent on the production required from one scutcher, 300 - 400 lbs./hour. Should a greater production than this be required, then multiples of this basic "Clean-O-Matic" line can be used.

It is pointed out that these four machines will give all the opening and cleaning desired if the cotton is given the necessary pre-opening and pre-cleaning. Herein lie the problems of proposing blowroom installations, because of the widely varying characteristics of the different cotton growths as regards staple length and micronaire values, but more particularly trash content and bale density. For example: for American strict middling cotton and similar varieties such as

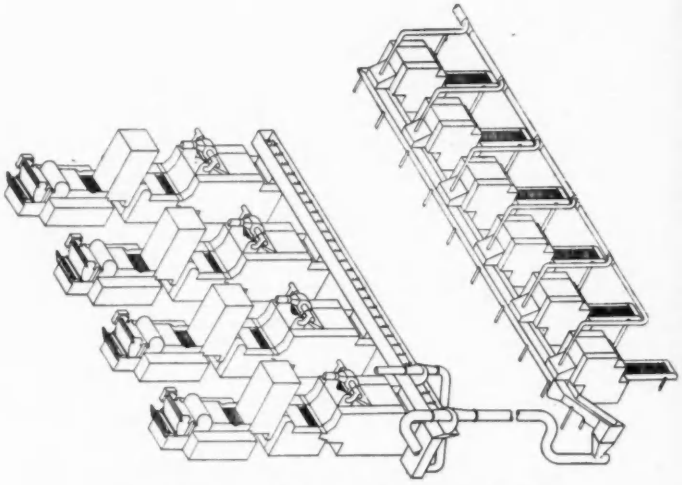


Schematic diagram of S.R.R.L. A—lattice feed conveyor. B—saw cylinders. C—picker cylinder. D—doffer cylinders. E—lint flue system

Sudanese and Colonial growths the line recommended would consist of a bale breaker, "Tweedales-Shirley" hopper, "Shirley" opener, reserve feeder and scutcher.

Should the customer so prefer, blending hoppers to feed on to a conveyor lattice or into piping can be supplied. The bale breaker is essential to prevent too much work being imposed on the T.S. hopper, but because of the high grade of cotton no other opening machines are required. The production of this line would be in the region of 350 - 400 lbs. per hour dependent upon the production required from the scutcher. Productions requiring two scutchers will be catered for by either two such lines or a number of blenders feeding two basic "Clean-O-Matic" lines by means of a two-way distributor. The construction of our reserve feeder does not allow the "Shirley" opener to feed two scutchers.

Indian and low American cottons require an additional cleaning capacity. Here, the "Revolution" opener comes into its own because of its excellent qualities as an opener and also because of its high production which is important when dealing with more than one scutcher. In an installation catering for a production of 750 lbs./hour, three blending hoppers feed the cotton into a pipe line which transports it to the rubberised feed belt of the "Revolution" opener. From this machine the cotton is drawn pneumatically by a two-way distributor and two "Shirley" delivery wheels, into two basic "Clean-O-Matic" lines. Should more than two scutchers be required, the two-way distributor would be replaced by a new automatic conveyor distributor. This arrangement is capable of feeding to either three or four basic lines, as required, according to the total production.



Isometric view of blowroom installation showing six blending hoppers feeding four basic "Clean-O-Matic" lines by means of an automatic conveyor distributor

Low grade Indian cottons such as Jarillas, Surat, etc. present a bigger problem as regards pre-opening and pre-cleaning, and T. and S. recommend the insertion of a vertical opener in the line following the initial bale opening machinery and immediately preceding the "Revolution" opener.

Many combinations of blowroom machines are possible to suit the different materials being processed. It is impractical to attempt to lay down all the possible combinations, as many variations are necessary due to limited floor space or particular preference. In making recommendations T. and S. state it would be most advantageous if they were in possession of as much information as possible about the cotton to be processed and the building in which the machinery would be erected, in order to obtain the highest efficiency. From a planning point of view, in many cases we have to accommodate the machinery in an existing building, and we require full details of the building in order to plan to the best advantage.

Letter to the Editor

Dust in Cardrooms

Sir,

As you are doubtless aware the problem of dust in cardrooms was raised in the House of Commons on July 30, 1958, by Mrs. Barbara Castle, M.P. for Blackburn, who asked Mr. Iain Macleod, Minister of Labour, "if he is aware that the publication of the Third Interim Report on Dust in Cardrooms may give the impression that measures to control dust given off during the stripping process are now of less importance; and if he will take steps to remove any such misapprehension.

Replying, Mr. Macleod stated: "The Third Interim Report on Dust in Cardrooms dealt with dust emitted during the carding process and what is said in it should not be taken as detracting from the importance which attaches to the removal of dust emitted during the stripping process. If, as the hon. Member says, there has been misapprehension on this matter, I hope that this statement will remove it."

This appeared in Hansard, Vol. 592, No. 153, page 135, dated July 30, 1958.

We believe that it will be of great interest to the trade to bring the official view of H.M. Government on this matter before them, and we hope you will find space to publish this in your Journal at the earliest opportunity.

Yours etc.,
George Hargreaves,
Director

All Wool and Blended Cloths

The patterns reproduced on the facing page are a selection from the high quality specialities manufactured by John Foster and Son Ltd., Black Dyke Mills, Queensbury. Brief details are as follows:—

(1) M1307. Lavender and black yarns are employed for this smart yarn dyed suiting. All wool, 58 ins. wide, it is 14/15 ozs.

(2) M1268. Composed of 50% wool and 50% rayon this neat subdued check effect cloth is 56 ins. wide and 15 ozs.

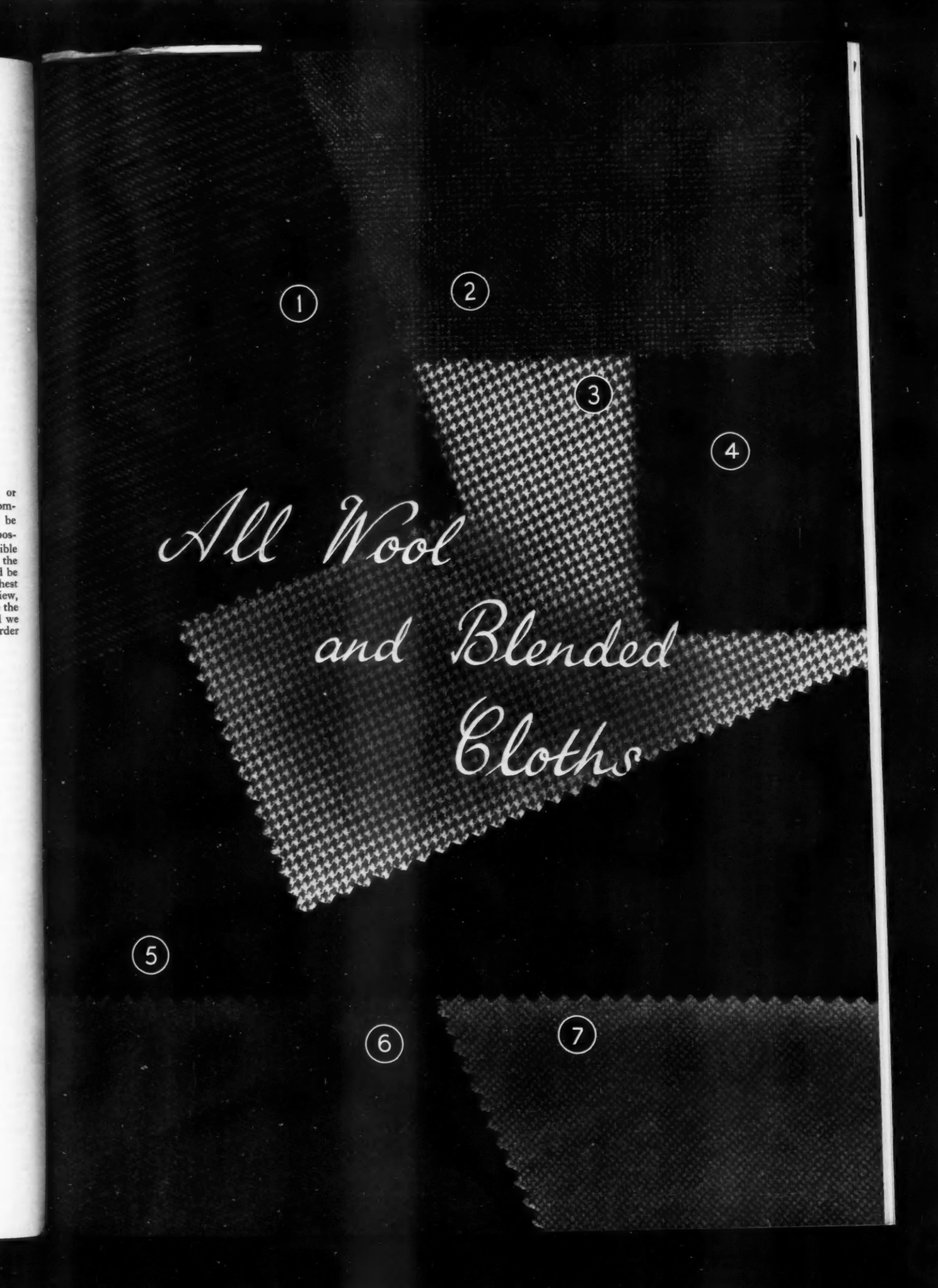
(3) M1304. Green, brown and white yarns are used in this popular shepherds check. All wool, it is 58 ins. wide, and 14/14½ ozs.

(4) M1251. Weighing 13/14 ozs. this 58 ins. wide cavalry twill is composed of 45% wool and 55% "Terylene." It is a dark grey shade.

(5) 19026. An all wool fancy knop effect—all black—it is 54 ins. wide and weighs 12½/13 ozs.

(6) M1366. In a medium shade of grey, this attractive skirt cloth is 45% wool and 55% "Tricel." It is 58 ins. wide and 13/14 ozs.

(7) 19033. In an oatmeal shade, this all wool mantle cloth is 56 ins. wide and 14/15 ozs.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Cloths
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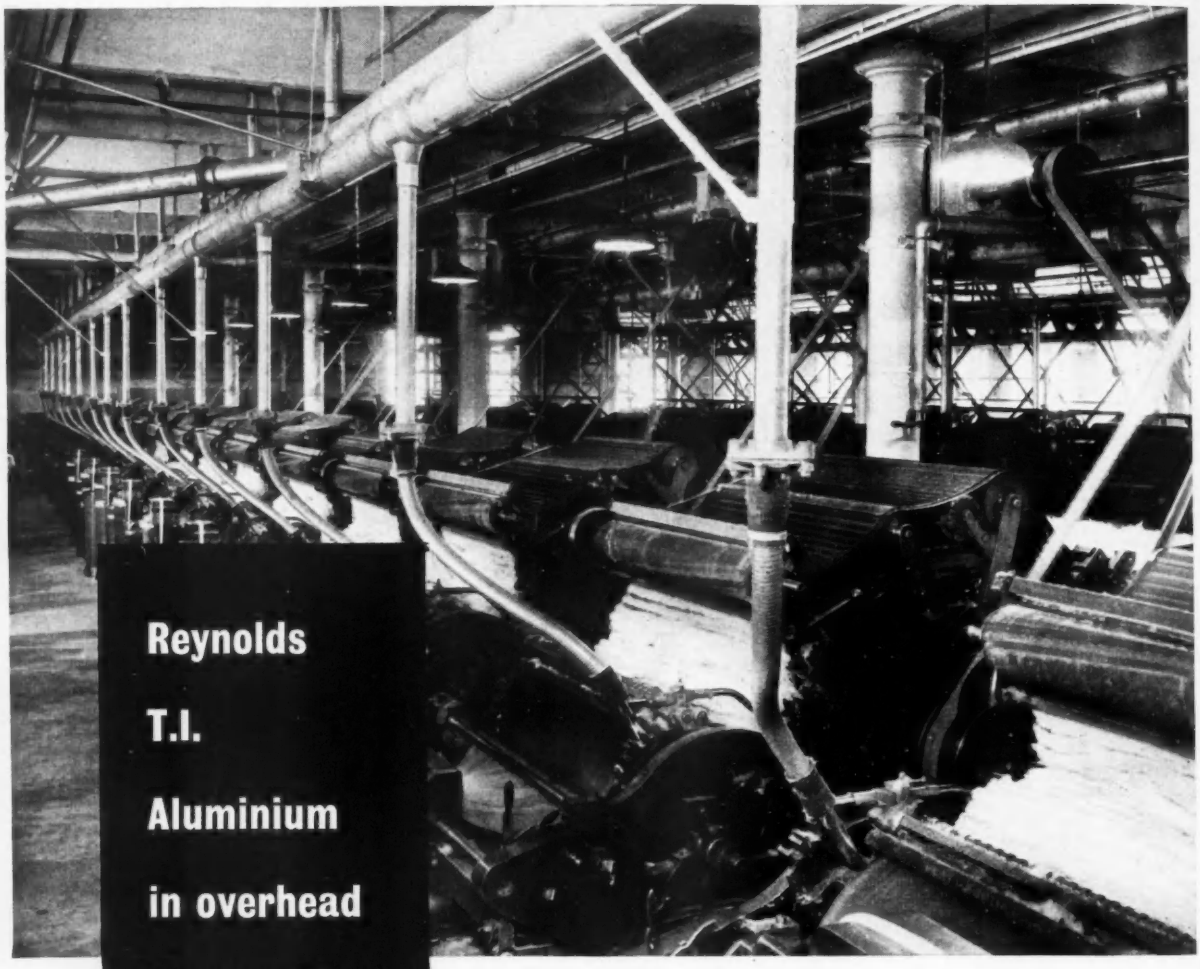

Reynolds T.I. Aluminium in overhead vacuum lines

Vacuum waste removal plant by WRIGHT HARGREAVES ENGINEERING CO LTD. BLACKBURN in PEEL MILLS, BURY.

The patented vacuum-operated waste removal plant illustrated uses 6″ diameter x ·063″ wall thickness seamless-drawn aluminium alloy tubing for the main overhead pipelines. Because this tubing weighs only 1·38 lbs. per foot—yet is strong and easy to cut—the overhead lines can generally be erected while the machines are in full production. The smooth bore helps easy flow because there are fewer "snags" for cotton fibres to build up on.

Reynolds T.I. Aluminium Ltd. have much to offer the Textile Industry. The best of British and American ideas and practices are yours for the asking.

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Effect of the Breast Plate on the Quality of Rove-Spun Jute Yarn

By Dr. S. B. BANDYOPADHYAY*

The function of the breast plate in the jute research spinning frame has been examined. Experiments were performed at different plate positions, rove twists, yarn grists and fibre lengths. Correct setting of the plate was found important but omission of it did not impair the quality of the yarns

IN the conventional jute spinning frames the roving passes over a smooth plate, called the breast plate, and also a tin conductor in the drafting zone between the drawing and delivery rollers. According to the standard books[1,2,3,4] on spinning, rove-twist and the conductor may not always restrain the movement of fibres in the drafting zone up to the desired level, especially in the case of light yarns, a pressure on the rove-fibres by the breast plate is needed for an additional control on them to ensure a uniform flow of fibres. In jute spinning such a plate seems to be of little importance, however, because about 20% or more of the fibres in the roving[5] have been found to be longer than the reach between the rollers. From the results of some spinning trials set out in Table 1, it will at once be observed that by use of the breast plate yarn quality has not improved; on the contrary, it has gone down in some cases, possibly due to incorrect setting of the plate. This led to the present investigation into the effect of the plate, at different settings, on the quality of the yarn produced.

Table 1
Quality Ratio of 10 ibs. Jute Yarn Spun with and without Breast Plate

Sample No.	Quality Ratio	
	With Plate	Without Plate
1	58	61
2	72	87
3	64	81
4	71	72

Spinning trials were conducted on a Fairbairn Lawson Combe Barbour warp spinning frame having 10 ins. reach and drafts 5 to 10, according to the standard laboratory procedure,[6] with necessary variations for different experiments. The roving was drafted in four different positions of the plate shown schematically in Fig. 1, including one without the plate. The position (*a*) is normal; here the roving made nearly equal angles (about 20°) with the plate on both of its sides with no bend at the conductor rod. In position (*b*) the entire bend, 40° approximately, of the roving was at the bottom of the plate. In position (*c*) the roving bent about 45° at the upper edge of the plate, and then curved slightly (10°) round the conductor rod. In position (*d*) the roving was not allowed to touch the plate, a bend of 30° at the conductor rod did, however, take place. The reach between the rollers was very near to 10 ins. in the first three positions, but in position (*d*) it was 9·6 ins.

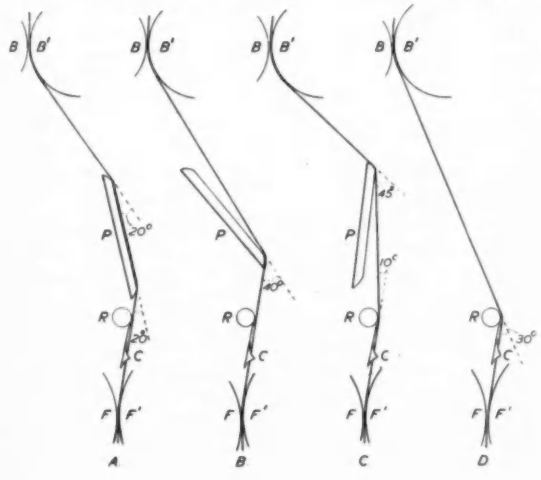

Fig. 1. A-B-C-D. The four positions of the breast-plate. B B' and F F' are drawing and delivery rollers. R—conductor rod. C—tin conductor

Variation in filament length was obtained by spinning a fibre sample in two batches, one composed of long jute alone (Set 1) another of 90% cut (6 ins.) jute and 10% long jute (Set 2). Three variations of rove-twist at 0·55, 0·70, and 0·85 t.p.i. were arranged for. Yarns were spun to different grists (wt. in lbs. per 14,400 yards) from 7 lbs. to 15 lbs., to alter the lightness of the yarn.

Since only a limited number of trials could be arranged, the experiments were carried out in three series, one after another, the variables of a subsequent series being adjusted according to the results of a previous series. In the first series, all the four positions, rove-twists 0·7 and 0·85 t.p.i. and yarn grists 7 lbs., 10 lbs. and 13 lbs. were used but 7 lbs. yarn could not be spun in Set 2 and in all 40 experiments in duplicate were performed. In the second, three different jute samples were spun at positions (*a*) and (*d*), rove-twist 0·7 t.p.i., and yarn grists 10 lbs. and 15 lbs.; 24 experiments with 10 replications each were done. In the third, two different jute samples were spun at positions (*a*), (*b*) and (*d*), rove-twists 0·55 and 0·85 t.p.i., and yarn grist 10 lbs. only;

* *Technological Research Laboratories, Indian Central Jute Committee, Regent Park, Tollygunge, Calcutta* 40.

Table 2

Average Quality Ratio Values
Average Q.R. Values

Position	Set 1 (a)	Set 1 (b)	Set 1 (c)	Set 1 (d)	Set 2 (a)	Set 2 (b)	Set 2 (c)	Set 2 (d)	No. of Readings for Each Average: Set 1	Set 2
1st Series ..	87·3	84·0	81·3	84·2	62·3	58·0	58·5	65·3	12	8
2nd „ ..	98·1	—	—	99·7	76·5	—	—	79·4	60	60
3rd „ ..	97·1	90·4	—	95·1	83·6	73·7	—	83·6	20	20

Table 4

Detailed Analysis of the Second Series (Set 2)
Q.R. Mean for Sample

Sample No.	Position (a) — normal	Position (d) — without	Critical Diff.	No. of Readings for Each Mean
1	81·4	82·7		
2	74·8	77·2	2·90	20
3	73·4	78·5		

24 experiments with five replicate bobbins in each were performed.

The total amount of fibre required for all the experiments in one set was treated in one bulk through the carding and drawing stages.

The yarns were tested for grist and strength in the usual manner, and the quality ratio was given by

$$\text{Q.R.} = \frac{\text{Breaking Load in lbs.}}{\text{Grist (Wt. in lbs. per 14,400 yds.)}} \times 100$$

Results and Discussion

The results were analysed and the yarn Q.R. value for each position averaged over other variations is given in Table 2. The tables of analysis of variance of Q.R. values due to different sources, viz., variation of position, rove-twist, grist etc. for each set of experiments are given in the Appendix at the end. The critical difference (C.D.) at 5% level between any two Q.R. means of Table 2 has been obtained from the error variance of each set and given in Table 3.

Table 3

Critical Differences for Q.R. means of Table 2

	Set 1	Set 2
1st Series ..	3·38	4·81
2nd „ ..	1·74	1·67
3rd „ ..	2·85	2·79

The position variance is significant in the first and third series but not so in the second series (Set 1); the second series of Set 2 requiring special consideration.

A comparison of the actual differences of Q.R. means in Table 2 with the corresponding C.D. values of Table 3, as well as the non-significance of position variance the second series (Set 1), however, go to show that the two extreme positions (*b*) and (*c*) are mainly responsible for producing significant variations in Q.R., and that there is no significant difference between the Q.R. values at normal plate position (*a*) and no plate position (*d*). The same conclusion applies also to two out of three samples in the second series (Set 2) as the detailed analysis in Table 4 indicates; only for one sample the difference between the Q.R. means at normal plate (*a*) and no plate (*d*) positions is significant and that, too, in favour of no plate position (*d*). The higher Q.R. in position (*d*) might be due to a slight shortening of the reach as already noted.

The tables of analysis of variance in the Appendix also show that, of the effects of interaction of the other variables on position, only those of grist in the first series (Set 2) and of rove-twist in the second series (Set 1) are significant. Here, too, the detailed results, given in Table 5, for position (*a*) and position (*d*) with which we are more concerned, show that the without plate position is not significantly worse than the normal plate position, at lower grist values or at lower rove-twists.

It may be concluded, therefore, that within the grist range 7 lbs. to 15 lbs., spinning with the breast plate in the normal position has no special beneficial effect on yarn quality ratio over spinning without any breast plate. Further, the plate should be correctly set, for if it is tilted too far away from the mean position (*a*) there is a chance that the yarn will be poorer in quality.

Table 5

Q.R. Means ± S.e.

	Grist (lbs.)	Rv.-tw. (t.p.i.)	Pos. (a) — normal	Pos. (d) — without
1st Series (Set 2) ..	10 lbs.	0·7	55 ± 1·5	61 ± 1·4
		0·85	56 ± 1·3	61 ± 1·5
	13 lbs.	0·7	64 ± 1·4	67 ± 1·5
		0·85	74 ± 1·3	72 ± 1·4
3rd Series (Set 1) ..	10 lb.	0·55	104 ± 2·2	102 ± 1·8
		0·95	102 ± 1·7	97 ± 1·7

Acknowledgement

The author thanks Dr. P. B. Sarkar (Director of Research) for his keen interest in the work and permission to publish the results.

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Appendix

Analysis of Variance of Yarn Q.R. Values

First Series

Source	Set 1 (Long Jute) D.F.	MSS	F	5% Level	Set 2 (Cut Jute) D.F.	MSS	F	5% Level
Grist (G)	2	1352	83·9	3·40	1	643·0	31·4	4·49
Plate (P)	3	72·31	4·48	3·01	3	93·00	4·51	3·24
Rove Tw (R) ..	1	14·08	0·87	4·26	1	98·00	4·75	
G × P	6	27·55	1·71	2·51	3	84·33	4·07	
G × R	2	12·33	0.76	3·40	1	32·00	1·55	
P × R	3	2·08	0·13	3·01	3	5·00	0·24	
G × P × R	6	14·66	0·91	2·51	3	10·33	0·50	
Repl. (Error) ..	24	16·16			16	20·63		
Total	47				31			

Second Series

Grist (G)	1	43·72	14·90	3·93	1	705·17	2·60	3·93
Plate (P)	1	10·60	3·60		1	32·93	12·10	
Sample (S) ..	2	124·26	42·20	3·08	2	61·79	22·80	3·08
G × P	1	1·15	0·39		1	7·26	2·67	
G × S	2	7·73	2·63		2	59·74	22·00	
P × S	2	3·07	1·04		2	5·09	1·88	
G × P × S	2	5·48	1·86		2	3·26	1·20	
Repl. (Error) ..	108	2·94			108	2·72	x	
Total	119				119			

Third Series

Plate (P)	2	238·1	11·9	3·19	2	655·8	34·20	3·19
Sample (S) ..	1	1981·1	98·8	4·04	1	4901·5	256	4·04
Rove Tw (R) ..	1	31·00	1·55		1	1044·0	54·40	
P × S	2	30·23	1·51		2	1·56	0·08	
P × R	2	69·75	3·48		2	9·09	0·47	
S × R	1	67·69	3·38		1	83·17	4·34	
P × S × R	2	8·27	0·41		2	6·59	0·34	
Repl. (Error) ..	48	20·06			48	19·18		
Total	59				59			

Table 4

Detailed Analysis of the Second Series (Set 2)
Q.R. Mean for Sample

Sample No.	Position (a) — normal	Position (d) — without	Critical diff.	No. of reading for each mean
1	81·4	82·7		
2	74·8	77·2	2·90	20
3	73·4	78·5		

Causes of Fires and Care of Installations

Factors for consideration include care of flexible cords, cables, portable appliances, connections and contacts, special fire risks, installation of cables, protection against excess current and other important points

By "ENGINEER-IN-CHARGE"

MANY fires continue to be caused every year due to electrical causes and as a result increasing consideration is being paid to preventive methods. Such fires may result from (*a*) an arc between the ends of a conductor which is severed whilst carrying current, (*b*) ignition of combustible materials by an electrically-heated appliance, (*c*) overheating of a conductor due to excess current caused by overload or failure of the insulation, or (*d*) an arc between two conductors at different voltage resulting from insulation failure.

Table 1
Analysis of Causes of Electrical Fires

Cause	Total fires
Defects in service equipment	82
Defects in fittings	121
Defects in wiring	264
Loose connections	44
Unauthorized wiring, etc.	54
Moisture	46
Heat	7
Defects in appliances	74
Earth faults associated with gas	188
Earth faults not associated with gas	27

Table 1 gives an analysis of causes based on information relating to electrical fires over a period of three years. It appears that the incidence of fires in electrical installations over ten years' old may be almost proportional to the age of the installation, thus special attention should be given to the older installations.

Almost all the fixed conductors on a wiring system are composed of many strands, and the risk of a complete breakage of such a cable is rather remote provided the cables are not sharply bent, are not subject to any appreciable tension, and are protected against mechanical damage where necessary. Wire armouring of the larger cables and the use of heavy-gauge screwed conduit for medium sized and smaller cables provides good mechanical protection in most cases.

Care of Flexible Cords and Cables

There may, however, be an appreciable risk of breakage of flexible cords to pendant lamps, and particularly of flexible cables to portable appliances where the cables are subject to a good deal of handling. A flexible cord may be broken by excessive tension. The maximum weight which should be supported by a twin 14/0·0076 flexible cord (rated for 2 amps.) is 3 lbs.; 5 lbs. for a twin 23/0·0076 flexible cord (rated for 5 amps.); or 10 lbs. for twin flexible cords of 40/0·0076 (rated for 10 amps.) or for larger flexible cords. Heavier lighting fittings should have independent means of support.

Considerable heat is generated in a modern gas-filled lamp, and this may tend to make the insulation of the flexible cord brittle near the lampholder. If the lampholder is moved about the insulation may then break down, allowing short circuiting and excess current to pass through the flexible cord with risk of fire. Inflammable shades should not be used and flexible cords should be firmly secured by the cord grip at pendant lampholders. Flexible cords should be inspected periodically and renewed if damaged. The cords should not be tied with string, nor allowed to touch any metal pipes or woodwork although, if required, they may be supported on insulated hooks. Pendant switched lampholders should be avoided if at all possible since, each time the switch is operated, the flexible cord is bent at its weakest point. It is best to dispense with flexible cord pendants if at all possible, using conduit (stem) pendants instead. Otherwise fireproof flexible cords such as Rockbestos are advised.

Flexible cables used with portable appliances should be of the circular tough-rubber sheathed type. The sheathing should be well secured at the plug and at the appliance and preferably reinforced at these points by means of a rubber sleeve. In the event of an intermittent interruption of the supply to a portable appliance the cause should be investigated immediately as, if one of the current-carrying conductors is broken, internal arcing may fire the flexible cable. In most cases the cause of such an interruption will be a loose connection at the plug or appliance, or a broken conductor near these points. The latter fault can often be found by pulling on the individual conductors of the cores. If necessary a short portion of the cable may be cut off at one or both ends, but in case of doubt a new flexible cable should be fitted.

A fire may also result from an arc between a "live" conductor and some other conductor at a different voltage. This might result from an exposed conductor of a flexible cable coming into contact with earthed metal, such as structural steelwork or piping; or being trapped under machinery. For this reason the insulation of flexible cables should be inspected periodically. If damaged insulation cannot be repaired by vulcanising it is best to renew the cable.

Care of Portable Appliances

Portable appliances must be fed through socket-outlets and plugs of adequate current rating. Since portable appliances are usually plugged

into socket-outlets without checking whether the circuit fuse is small enough to protect the appliances against overheating due to excess current in the event of a fault, it is best to feed such an appliance through a three-pin plug having a cartridge fuse fitted in the "live" role. The rating of the cartridge fuse should not exceed the current rating of the flexible cable, with the exception of a 14/0·0076 cable (rated at 2 amps.) which may be fed through a 3 amp. fuse in a plug. A cartridge fuse in a plug should not be replaced by bare wire. The cartridge fuse is designed to enclose the fuse and extinguish any arc formed when the fuse melts, which might otherwise cause short-circuiting inside the plug itself. Lampholder adaptors are generally unsuitable for supplying portable apparatus since they are not intended to carry more than 1 amp. current, such an adaptor provides no earthing connection, and movement of a pendant lampholder is to be avoided. Long flexible cables are liable to damage and should be avoided by the provision of an adequate number of socket-outlets in convenient positions.

It is important that the earthing core of a flexible cable to a portable appliance be maintained intact in order to avoid risk of electric shock in the event of an earth fault, or failure of insulation between the conductors and casing of the appliance; and also to avoid possible risk of arcing between the metal casing of a defective appliance and earthed metal, such as a gas pipe. It is advisable that the length of the earthing core in the plug be such that, in the event of failure of the cable grip, the current-carrying conductors shall be subject to tension before the earthing core. It is very desirable that the earthing core of the flexible cable be tested daily, if in constant use. Test sets are available which can be used by unskilled labour to make this test in about one minute. The test set passes an appreciable current through the earthing conductor, a lamp indicating whether the cable is in order or otherwise.

Connections and Contacts

The greatest number of fires due to defective fittings occurs in fuse and distribution fuse boxes, control units and the like, and are mainly caused by loose connections. Such connections may overheat due to increased resistance, or may allow arcing due to the circuit being interrupted. For this reason all control gear should be examined periodically to ensure that arc resisting barriers are in position and undamaged; that fuses are not overheating due to overload, the fusible elements being too small, the fuse contacts having become softened or out of adjustment, or faulty connections. Contacts of control gear should be maintained in good condition and with adequate pressure on contacts. Connections which are subject to vibration should be secured with lock nuts or spring washers.

Since there are contacts in many electric motors, as at the brushes of commutator and slip-ring motors, and at the centrifugal gear of many single-phase motors, inflammable materials such as fluff, should not be allowed to accumulate in these machines as there is a risk of them being ignited by arcing under faulty conditions.

Heating Appliances

Electrical heating appliances should be installed and maintained in such a way as to avoid risk of fire. The operating temperature of a heating appliance, or any other electrical appliance, depends largely on the rate at which it can dissipate heat into the surrounding atmosphere. It follows that the temperature of an appliance will increase if it is fitted in a confined space, or is shrouded by clothing, etc. The ventilating screens of ventilated types of apparatus must be kept clean.

The use of radiant heaters operating with red-hot elements should be avoided if at all possible. Where they are essential they should be placed away from combustible materials and where they are not liable to be knocked over. The elements of such a heater should be protected so that they cannot be touched accidentally, and the person using the heater should be made responsible for switching off if the heater is left for any length of time. Contacts on elements should be kept in good condition to avoid risk of arcing at these points. Heating appliances which operate with elements at less than red heat, such as smoothing irons, should be fitted with a pilot lamp. The plug feeding an iron or other portable appliance should be withdrawn from the socket-outlet if the appliance is left, and a safe position should be provided where a smoothing iron can cool down after use.

Any fixed appliance having a rating of more than 60 watts needs adequate ventilation. If it does not have a non-combustible enclosure it should be fitted so that no unprotected woodwork is within 12 inches vertically, or 6 inches in any other direction, from the apparatus. Any lamp which might touch combustible materials must be adequately protected by means of a robust guard of non-inflammable material; and small bayonet capped lampholders (S.B.C.) must be protected by a fuse rated at not more than 3 amps.

Special Fire Risks

Apparatus having flameproof enclosures, or intrinsically-safe apparatus, must be used where there might be a risk of explosion due to ignition of an inflammable concentration of gas or vapour. Every fixed item of electrical apparatus fitted in a place where petrol-driven vehicles are stored or repaired should either be of the totally-enclosed or flameproof type or be fitted at least four feet above the general floor level. Cables fitted in places where inflammable or explosive dust, vapour or gas, is likely to be present should be fitted in solid drawn screwed conduit, or should be metal-sheathed and armoured, or mineral-insulated and metal sheathed. It should be mentioned that where cables, conduits, cable trunkings or ducts pass through walls, partitions or ceilings, the hole should be made good with cement or similar fire-resisting material, leaving no space through which fire or smoke might spread.

Installation of Cables

Where conduits, cables or conductors are installed in ducts, chases, channels, troughings, shafts or trunkings which pass through floors, walls, partitions of ceilings, suitable fire-resisting barriers should be provided as may be necessary to prevent spread of fire. Rubber, P.V.C., or polythene-insulated cables should not be installed in a position where the ambient temperature exceeds 113°F., although impregnated-paper and varnished-cambric insulated cables may be used in ambient temperatures up to 167°F., whilst cables covered with asbestos-roved rubber or asbestos-roved cambric may be used in a ambient temperature up to 176°F. Mineral insulated cables are advised for use in higher ambient temperatures.

Protection Against Excess Current

The rate of heat generation in a cable or appliance is proportional to the square of the current value, so that excess current must be avoided in order to keep the operating temperature within safe limits. Excess current may be due to mechanical overload of an electric motor; whilst excess cable

Table 2
Approximate Sizes of Fuse Wires, in Semi-Enclosed Fuse Holders, for Various Current Ratings

Current rating of fuse (amps.)	Tinned-copper fuse wire		Standard-alloy wire (63% tin, 37% lead)	
	Dia. (in.)	S.W.G.	Dia. (in.)	S.W.G.
1·8	—	—	0·0164	27
3	0·006	38	0·024	23
5	0·0084	35	0·032	21
8·5	0·0124	30	—	—
10	0·0136	29	—	—
15	0·020	25	—	—
17	0·022	24	—	—
20	0·024	23	—	—
24	0·028	22	—	—
29	0·032	21	—	—
38	0·040	19	—	—
45	0·048	18	—	—
65	0·056	17	—	—
78	0·072	15	—	—
102	0·080	14	—	—

Table 3
Suggested Fuses for Circuits Wired with Single-Core P.V.C.-, T.R.S.-, or V.R.I.-Insulated Cables

Nominal cross-sectional area of conductors (in.²)	Number and diameter (in.) of cable wires	Current rating of each of 2 bunched cables on d.c. or single-phase	Normal number and size of protective fuse wires on d.c. or single-phase. Tinned copper	Maximum fuse for d.c. or single-phase motor sub-circuit with O/L trips. Tinned copper	Current rating of each of 3 or 4 bunched cables on 3-phase circuit	Normal number and size of protective fuse wires on a 3-phase circuit. Tinned copper	Maximum fuse for a 3-phase motor sub-circuit with O/L trips Tinned copper
0·0015	1/0·044	5 A	1/35 s.w.g.	1/29 s.w.g.	5 A	1/35 s.w.g.	1/29 s.w.g.
0·002	3/0·029	10 ,,	1/29 ,,	1/23 ,,	10 ,,	1/29 ,,	1/23 ,,
0·003	3/0·036	15 ,,	1/25 ,,	1/21 ,,	13 ,,	1/26 ,,	1/22 ,,
0·0045	7/0·029	20 ,,	1/23 ,,	1/19 ,,	15 ,,	1/25 ,,	1/21 ,,
0·007	7/0·036	28 ,,	1/21 ,,	1/18 ,,	25 ,,	1/22 ,,	1/18 ,,
0·01	7/0·044	36 ,,	1/19 ,,	1/17 ,,	32 ,,	1/20 ,,	1/17 ,,
0·0145	7/0·052	43 ,,	1/18 ,,	1/15 ,,	39 ,,	1/19 ,,	1/15 ,,
0·0225	7/0·064	53 ,,	1/18 ,,	1/14 ,,	48 ,,	1/18 ,,	1/14 ,,
0·03	19/0·044	62 ,,	1/17 ,,	—	56 ,,	1/18 ,,	1/14 ,,
0·04	19/0·052	74 ,,	1/16 ,,	—	67 ,,	1/17 ,,	—
0·06	19/0·064	97 ,,	1/14 ,,	—	88 ,,	1/15 ,,	—

current may be caused by using too large an appliance, or too many appliances from given cables, or failure of insulation.

In order to keep the temperature of a motor within safe limits it should be protected by overload releases in the starter which will automatically switch off the motor in the event of sustained current 25% above the full-load current rating of the motor. Where there is difficulty in so doing alternative protection may be provided by means of a bi-metal device fitted in the motor to switch off the starter if the temperature of the motor reaches a dangerously high value. The cables between a slip-ring motor and its rotor starter should have a current rating equal to the full-load rotor current of the motor; except where slip-ring short-circuiting gear is fitted and used, in which case the current rating of the rotor-circuit cables may be half the full-load rotor current of the motor.

The protection of cables against overheating due to excess current resulting from overload or failure of insulation is provided by correctly rated fuses, or circuit-breakers having correctly set over-current releases. The size of fuse fitted on each circuit and sub-circuit should be checked against the correct size, which should be marked in the distribution or fuse box. Table 2 gives the sizes of fuse wires for various current ratings in fuse holders of normal design. The current rating of each fuse should not be more than the current rating of the cable fed through that fuse with certain minor exceptions, such as the fuses protecting certain pilot lamp and control circuits, fuses protecting interconnecting cables not exceeding two yards in length between switchgear (where the rating of the fuse should not be more than twice that of the cables) and certain motor circuits. The final sub-circuit which feeds a motor may have fuses rated up to twice the current rating of the cables provided overload releases are fitted in the starter to afford protection against excess current in the motor and in the cables between the starter and motor.

Table 3 gives suitable sizes of fuses for various circuits.

Carpet History

British-made carpets using "Acrilan" acrylic fibre will be on sale in late September. Carpets made with "Acrilan" are reported to have had remarkable success among leading manufacturers in the U.S. and two British manufacturers now announce the lanuching of ranges of carpets made with "Acrilan." Wm. C. Gray and Sons Ltd. are producing a range of woven carpets in 100% "Acrilan" distributed by A. V. Humphries Ltd., and Rivington Carpets first introduce a quality in 70% "Acrilan"/30% nylon. Both these ranges incorporate the heavy denier "Acrilan" fibre engineered especially for the carpet industry. This fibre, with its round cross section has the valuable property of resistance to stain. The fibre also retains the quality of "bounce" associated with "Acrilan" in its other uses and is said to produce a carpet which has extremely high resilience.

Effect of Drought in Australia and S. Africa

World wool output is expected to be lower next season, mainly because of drought in Australia and South Africa. While it is still too early for any detailed appraisal of the season's wool prospects, states the Commonwealth Economic Committee, it is now clear that for the second year running world production will be lower than in the preceding season. A drop of about 2% in world output may well occur in 1958-59, following the 3% reduction in the season just ended. The first estimate of the Australian Council of Wool Selling Brokers indicates that the clip in that country is expected to fall by some 3%, to a total of about 1,386 million lbs., greasy. Due to widespread drought the new clip has been grown during one of the most difficult seasons experienced by Australian graziers for many years and much of the early shorn wool has a large proportion of short fibres.

In South Africa, too, drought has been widespread over a large part of the wool producing area of Cape Province, but how seriously this will affect production is not yet known. Wool growing in New Zealand has been less affected by adverse weather, so that a further increase in that country's output may occur next season. In South America the main problem relates to the disposal of the large quantities of unsold stocks. These are now reported to amount to nearly 350 million lbs., or over half the season's output in Argentina and Uruguay. Producers in the two countries are strongly pressing their Governments to grant more favourable export rates so as to counteract the effects of the world fall in wool values and enable overseas sales to be resumed.

Western Germany:
Woollen and Worsted Piece Goods

Karl Kritzler, Ruenderoth/Bez. Koeln, Oststrasse, are interested in an agency for woollen and worsted piece goods for sale to clothing manufacturers; they do not sell to retailers or tailors. Herr Kritzler was for many years the manager of a large worsted weaving mill in central Germany, and set up as a commission agent in 1948. He represents three Bradford wool and wool waste merchants, two German wool importers and a shoddy mill. Manufacturers interested should write direct also notify the British Consulate-General, Commercial Section, Dusseldorf, Cecilien Allee 16.

South Africa:
Suiting and Linings

Newton's Agencies Ltd., 55 Quebec House, Smal Street, Johannesburg, are interested in U.K. agencies for sleeve linings, pocketings, etc., and suitings. Established in 1935, the firm cover the Transvaal, Orange Free State and Natal. Suppliers interested should write direct, also notify the U.K. Trade Commissioner, P.O. Box 10101, Pritchard House, Pritchard Street, Johannesburg.

Special Features in New Ring Spinning Frame

Only 27 ins. in overall width this new machine has covered individual spindle drive, straight line spinning, traverses up to 12 ins., and scientific balloon control ring application

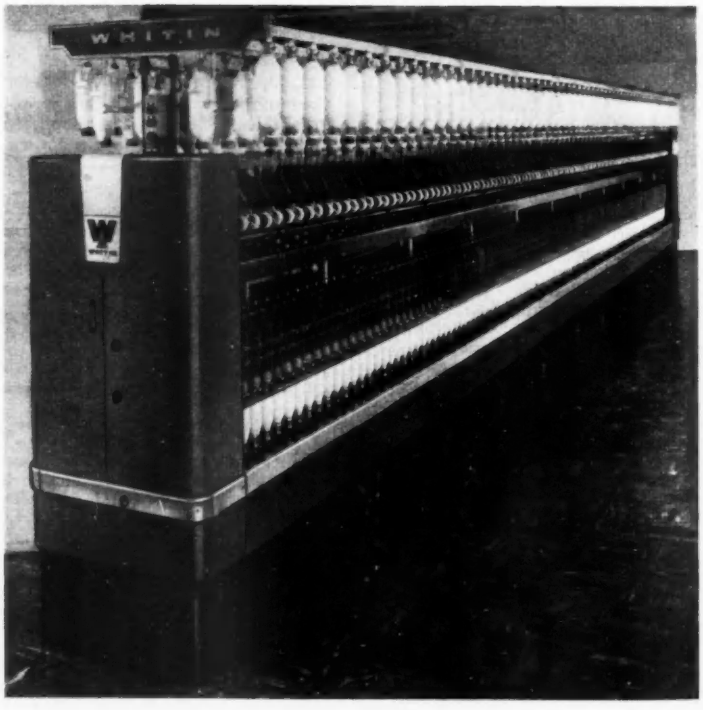
A STREAMLINED new spinning frame reported to combine many recent technological advances is announced by Whitin Machine Works, Whitinsville, Mass., U.S.A., and will be on view in Britain for the first time at the Textile Exhibition at Belle Vue, Manchester, in October. Known as the Model K, the new frame is styled to achieve an exceptional combination of form and function. Giving preliminary details the makers draw attention to the following features: 27 ins. overall width, covered individual spindle drive, side drive shafts, straight line spinning, traverses up to 12 ins., and scientific balloon control ring application. All gearing and a new builder unit are enclosed in the head end. Pneumatic waste removal unit and a new arrangement to disperse motor heat are integrated in the basic design. "Unitrol" top arm weighting and the latest type of Whitin "Super-Draft" two-apron drafting systems are employed. Either a 3½ or 4 ins. gauge with appropriate ring size is available and machines can be made with up to 288 spindles in 3½ ins. gauge or 240 spindles in 4 ins. gauge. The machine is available in spindle increments of 24. Five years in development, the Model K has been thoroughly tested both in the Whitin research department and in mills in the broad range spinning all counts, and comparable performance characteristics can be expected with the innumerable synthetics and blends.

Frame Construction

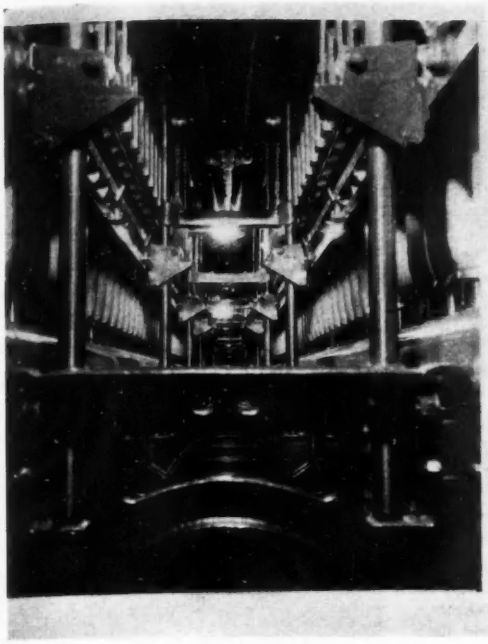
Particular attention has been given to securing constructive rigidity and capacity for absorption of vibration. The head end is an assembled cast iron unit and the side rails and samsons are also cast iron. The ring rails and roller beams are steel. For added rigidity, single piece roll stands extend across the frame connecting both sides. Running the length of the frame, two spindle drive shafts are mounted close to the spindle rail. The 27 ins. overall width of the machine realises 25-35% saving in floor space over standard 39 ins. frames which are 42 ins. over the bumper rails. Maximum exploitation of floor space can be realised where mill conditions permit. Many present mills with 24, 25 or 26 ft. bays are restricted in the number of frames that can be accommodated. The favourable small space requirement of the Model K ensures more spindles in a given area.

Single Spindle Drive

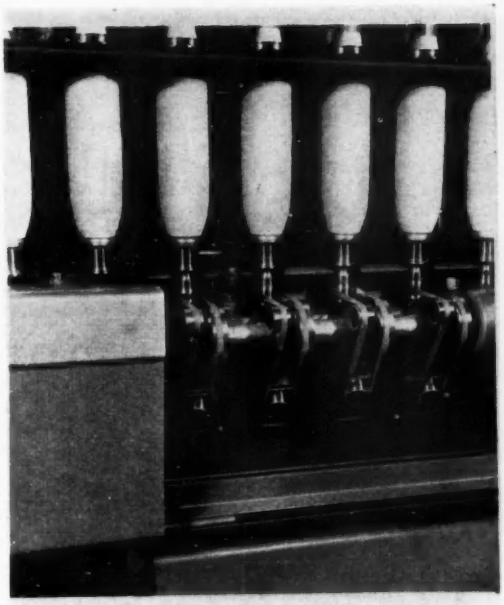
An entirely new drive mechanism is employed in which each spindle is driven by a small, strong, endless belt. With 180° contact whorl, this belt drive provides uniform spindle speeds and uniform twist generation. The entire driving unit and idler pulleys are mounted on sealed anti-friction ball bearings. Speed ratio of spindle drive shaft to spindle is 2·50 : 1. Starting, stopping or operation of any one spindle in no way affects the operation of any other. Less than 10 secs. is required to replace a driving belt whether the machine is stopped or



Whitin Model K. Spinning frame. Overall view



(left) View under frame showing absence of cylinders and tapes



(right) Individual spindle drive from side shafts

running and the new single spindle drive eliminates cylinders, tapes and tape tension pulleys.

Straight Line Spinning

Today's conditions involve factors not previously considered critical, such as larger roving packages, more precise drafting systems and speeds of a much higher order. Consequently, successful application of straight line spinning at high speeds with large packages is closely related to satisfactory balloon control. The principal advantage of a straight line from front roller to spindle is that twist can run unimpeded from the traveller to the nip of the front roller. In the Model K, straight line spinning, higher uniform spindle speeds, improved twist distribution and scientific balloon control are claimed to give higher production of more even yarns.

Balloon Control

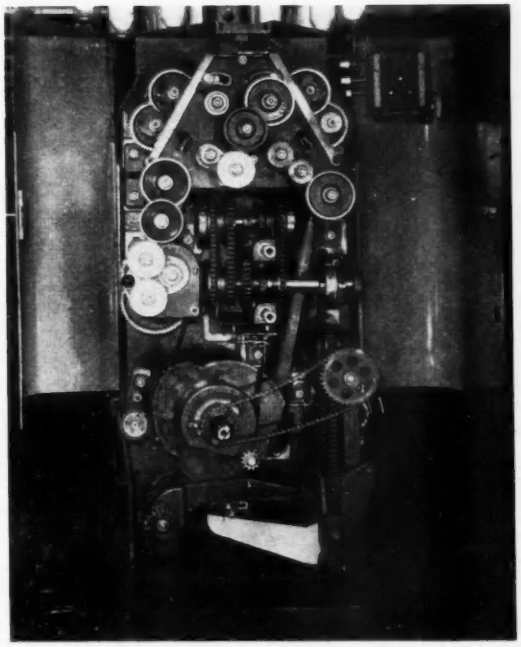
The balloon control arrangement employs two control rings slightly larger than the spinning ring. Moving simultaneously and over the same distance, the rings act to separate the balloon into several smaller ballons which maintain the same relationship through the traverse. Prior to doffing, all balloon control rings are raised and folded back out of the way, an important factor in reducing doffing time. Five seconds or less is required to wind up the control rings and thread guides and little effort is required because of the nicety of balance.

Reduction of yarn tension makes its greatest contribution to improved spinning condition by reducing the number of ends down and the makers' point out that this is significant on the Model K. More uniform yarn tension, longer distance for twist distribution and fewer ends down all contribute to more even, stronger yarn. It is reported that mill tests have indicated that yarns spun on the new machine at higher spindle speeds are more even and have higher break factors than yarns in regular production in the same mill with the same roving.

Spindles and Brake

The spindle is Whitin's latest anti-

(*continued on page* 464)



Head end view with doors open and both panels removed showing gearing, builder motion, etc.

Scientifically Designed Precision-Built Automatic Now in Quantity Production

The "Shirley" automatic loom—a distinctive achievement resulting from the united efforts of Shirley Institute, Wilson and Longbottom Ltd., and the weaving industry—has many exceptionally interesting features

OVER a number of years, Shirley Institute has acquired a unique amount of information on the construction and operation of loom mechanisms both in its own weaving shed and throughout the mills in this country. In addition, its staff are frequently called upon to examine defective fabrics and assess the causes of the defects. Soon after the last war, the Institute decided to make use of this information and construct a pirn-change loom primarily, but not exclusively, for man-made fibres. An essential requirement should be simplicity combined with precision, especially in those mechanisms which affect the quality of the fabrics. The specification of the loom was arrived at by the Institute staff in conjunction with a panel of weaving experts from the leading firms in the industry. The specification was circulated to a number of weaving firms and many helpful suggestions and comments were received, some of which were incorporated in the specification. The loom is thus a three-fold effort on the part of the industry, the British Cotton Industry Research Association, and a firm of loom makers well known throughout the world—Wilson and Longbottom Ltd., Barnsley.

Design Factors

The basic factors governing the design of the loom were as follows:—

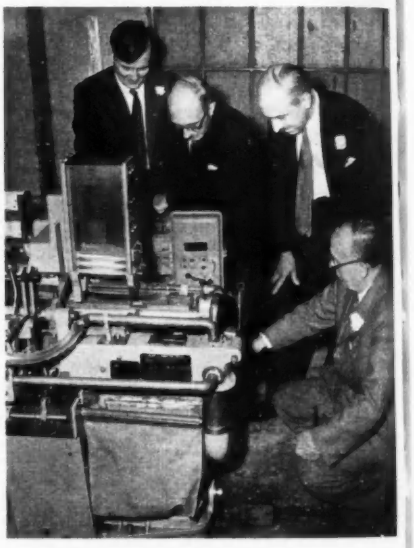
(1) The loom to be especially capable of weaving "flat," continuous filament, and crepe cloths free from defects, especially "barriness," and accurately to specification.

(2) The loom to be precision built with the minimum number of parts and worn parts to be readily replaceable.

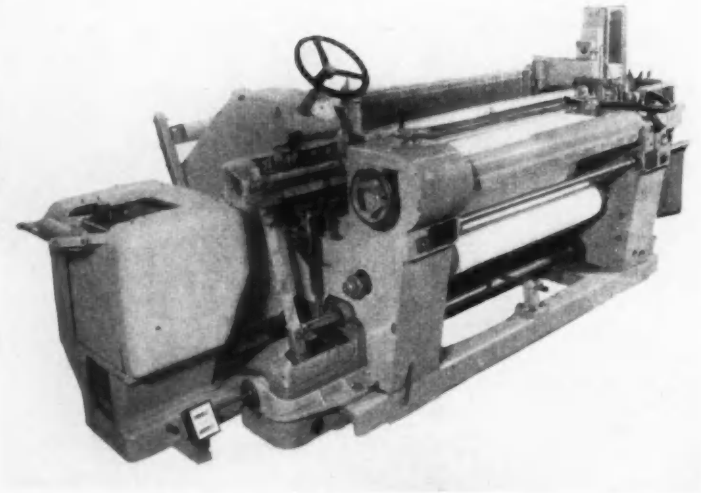
(3) Special attention to the position of lubricated parts to prevent soiling of the yarn and cloth.

(4) To have the minimum number of parts which would be affected by changes in atmospheric conditions, i.e. elimination of wood, leather and bands wherever possible.

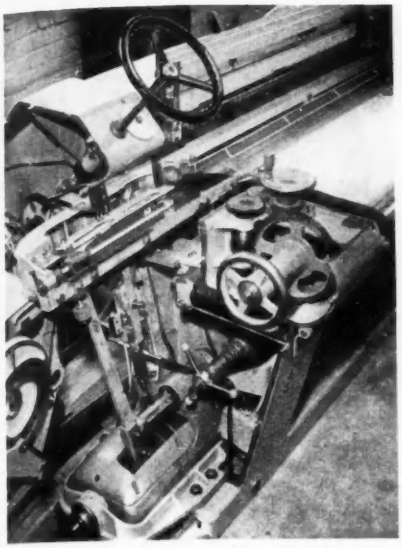
(5) The loom to be designed to make it as easy as possible for the overlooker to gait a warp and to set accurately and easily, the various



Watching the new loom in operation (l. to r.) Mr. I. S. Porter (technical director); Dr. D. W. Hill (director of research, Shirley Institute); Mr. F. M. Harvey (Sales Manager) and Mr. Ossian W. L. Porter (chairman and managing director) Wilson and Longbottom Ltd.)



A view from the dobby side of the "Shirley" automatic loom



View showing the picking and cloth take-up arrangements, also the hand-wheel and setting indicator

parts of the loom in the minimum time.

(6) The loom to have the minimum number of adjusting points and to be designed for ease of maintenance.

(7) The operation of the loom to be as simple as possible.

The prototype, constructed in Shirley's own workshops, incorporated several notable features including a simplified picking mechanism with the cam and its follower running in an oil bath, an extremely high-speed positive dobby, a new take-up motion and a special let-off motion. After a period of vigorous testing it was taken over by Wilson and Longbottom Ltd., who had been granted world rights for the production of the loom. In close collaboration with the Institute staff the company turned it into a production model the prototypes of which have been severely tested under mill conditions and have successfully woven an extremely wide range of fabrics with excellent results.

Constructional Features

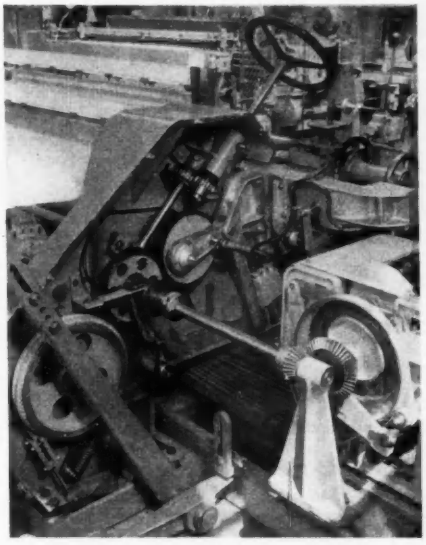
The loom is assembled on a robust, machined cast-iron base plate running the full length of the loom and housing not only the loom sides but all auxiliary bearings, bracket and motor. The loom sides are box type in construction and the major part of the mechanism is inside these boxes. In this manner, those parts that have to be lubricated are kept away from the warp and the cloth. The inspection covers enclosing the loom sides are easily removed without using either screwdriver or spanner.

The picking mechanism in itself is extremely interesting. A combined bottom shaft and swing rail is employed and the picking cam and its rotating follower run in an oil-bath. Made from special hardened materials, the cams and followers are readily adjustable and replaceable. A special picking stick check motion is fitted, connected by a lever directly to the picking stick and which operates a small piston. The piston is free to travel during the normal movement of the picking stick but when the shuttle has left the picker, the stick is very effectively checked by air compression in the cylinder. This prevents sudden shock occurring and ensures that no sudden shock reaches the reed. Special double swells are provided. A longer swell operates the stop-rod and a shorter one—which passes through the long one—is used to stop the shuttle towards the end of its movement along the shuttle box. The pressure of the smaller swell is released before picking takes place.

The box motion is controlled by intermittent gearing housed immediately below the boxes. It runs in the same oil bath as the picking motion and is fully protected by escape mechanisms. The sley, made of light alloy, is operated by eccentric pins housed in the silk members. This entirely removes the danger of oil splashing on to the warp.

Shedding

Shedding is by a positive, double lift, open shed dobby of simple construction and capable, because of the small mass of its moving parts, of speeds far in excess of normal loom speeds. The dobby, mounted on an extension of the base plate, is totally enclosed and has its own automatic lubrication system. Provision is made for disengaging the dobby from the loom and turning it by hand by a readily accessible hand-wheel mounted at the front of the loom and which can also be used to turn the loom itself. The handwheel is geared down 2 to 1 in order to facilitate turning and is fitted with a timing disc so that loom settings can be accurately and consistently made. The only mechanism between the loom sides is the under motion used for transferring the movements of the dobby jacks to the heald frames. An important point is that each dobby jack is fitted with three holes which increase or decrease the shed by 10% but these holes are so



View from back of loom showing the compact let-off motion

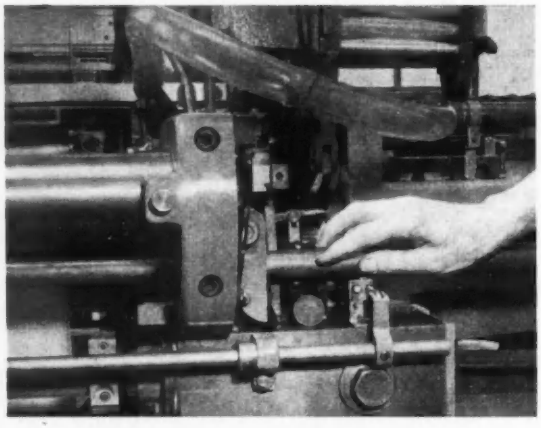
placed that the bottom warp line always remains constant and thereby there is no danger of the warp being in an incorrect position on the raceboard. A fully machined tappet shedding motion mounted in the same position as the dobby can also be fitted if required.

Let-Off and Take-Up

The let-off motion is of the controlled, negative type using rope friction braking on one side of the beam only. It is simple in construction and no alteration to the weights is required as the beam weaves down. Provision is made for replacing beams without any adjustment to the let-off motion whatsoever. The beams themselves rotate in housings carried on self-aligning ball bearings to ensure absolutely even rotation.

The take-up motion essentially consists of three spur gears and a worm and wheel gear giving a large reduction in one stage. It is designed to eliminate take-up barring since the periodicity of the gear wheels is such that even with badly made or mounted gear wheels no bars will be seen in the cloth. This is particularly important for delicate filament fabrics. When the loom is at rest, the take-up motion is automatically disengaged from its drive so that the weaver can, if necessary, adjust the take-up roller without undoing any catches.

A unique feature of the loom is that the distance of free cloth between the fell and the take-up roller can be



Absence of vibration and shock enables a penny to stand on its edge when the loom is running at full speed

varied to suit the type of fabric being woven. It has been found that in order to weave medium and low taffetas free from irregularities in the spacing of weft, a longer length of cloth is required between the fell and the take-up roller than for instance for a poult taffeta or for most light nylon fabrics. On the other hand, for a very wide range of fabrics, there are considerable advantages to be gained in having a short length of cloth before the take-up roller and, incidentally, this simplifies many templing difficulties.

Pirn Change

The magazine of the pirn change mechanism is of the two stack stationary type and 14 pirns can be accommodated in each stack. Lashing-in of the weft both on the magazine side after a pirn change and on the double box side during normal running is prevented by suction control operating from the fan built on to the motor. In addition, at the single box end, a pressure air jet ensures that the weft does not get trapped in the box. The air pressure can be adjusted by a readily accessible valve. These controls enable satisfactory weaving to take place with greatly reduced weft tension.

Centre Weft Fork and Braking System

The centre weft-fork is of special design and its operating shaft is mounted on ball bearings. It is extremely sensitive in operation, and through its connections to the starting handle and powerful braking mechanism, will stop the loom even if the weft breaks after the shuttle has passed through the warp. Even if the weft breaks upon entering the shuttle box, the loom will stop before beat-up. This is important for delicate yarns which always leave a mark if a broken weft thread is beaten up.

Simplified Maintenance

It will be noted that apart from the picking sticks and cloth rollers, no wooden members are used on the loom and picking straps, lug straps and leathers have been eliminated. The picking mechanism and box motion are all operated from the rocker shaft of the loom which rotates at half the speed of the crankshaft.

New Spinning Frame

(*continued from page* 461)

friction type equipped with a new positive action hand brake. The brake lever is conveniently located on top of the spindle drive housing; it acts in a squeezing motion applying equal pressure to both sides of spindle. One of the most important elements in the frame, the "Pioneer" spindle is remarkably strong and stable in running performance at high speeds with low maintenance, lubrication and operational costs.

Gearing Arrangement and Builder

Main drive gearing, draft gearing, complete builder and traverse mechanisms are all contained within the streamlined head end. All gears are case-hardened steel, precision cut and with same bore, face and pitch to permit interchangeability of draft, twist and lay gears. Eight bearings only require lubrication at six-month intervals, all other head end bearings are sealed-for-life ball bearings. All gears are easy of access; safety-lock doors open wide and automatically shut the machine off when open. Three ranges of draft are obtainable by changing two gears. The total draft range is 5-75. For any one of the three draft constants (1·33, 2·0 or 4·0) the number of teeth in the single draft gear equals the draft desired multiplied by the constant used. Draft change gear calculation thus is greatly simplified.

New Builder

The building motion provides another interesting improvement. Cam action is transmitted into precisely controlled motions for the ring rails and balloon control rings. Some excellent features include: simplified adjustments and operation, accessibility for changing winds, easy and exact pick selection. The cam action is transmitted to a horizontal shaft through the new building motion. Directly connected to this shaft, ring rail chains and counterbalance springs provide positively uniform raising and lowering motions. The Model K's builder is said to provide a new degree of precise ring rail motion so important to good bobbin taper, formation, wind, yarn lay and high-speed wind off. Warp, weft or combination cams can be used. Guided by large, lint-free concave guide rolls, ring rail chains effect a steady motion of the ring rails. Compensating cams and heavy spring counterbalancing combine to provide uniformity of movement.

Drafting Arrangements

Whitin's "Super-Draft" on the Model K is a system which has been used on frames employing more than 12,000,000 spindles. It provides accurate control of the fibres, flexibility in handling fibre lengths and excellent all around performance on the full range of drafts and counts. The bottom rollers, casehardened and screw jointed, are manufactured to close tolerances. Since non-lubricated top rolls are used in the middle and back, no lubrication is required except for several-year-cycle lubrication of the front top rollers. Introduction of oil, and attendant yarn spoilage, is eliminated from the drafting area. The company's latest "Unitrol" top arm weighting is used and a single line of revolving clearers employed thus leaving the remainder of the drafting area open to the cleaning action of the overhead cleaners.

TEXTILE MACHINERY and MILL EQUIPMENT NEWS

New Rectilinear Comb for Wool and Mixtures

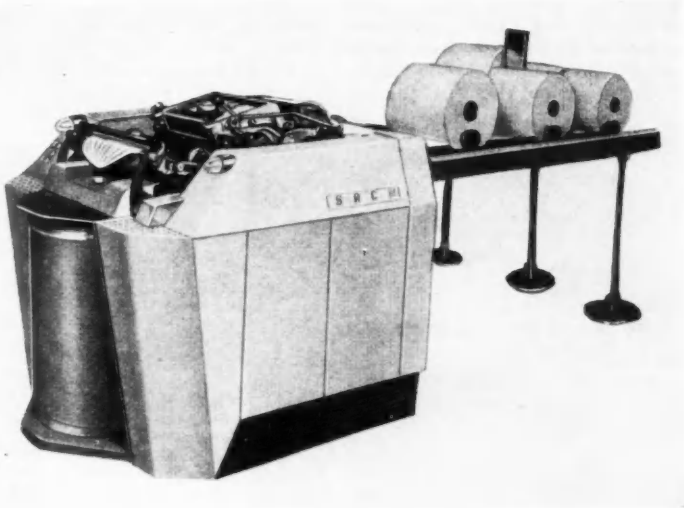
Specially designed for high speed operation the makers claim that 26 to 32 lbs. of top per hour can be obtained at minimum speeds

A NEW rectilinear comb (the PERL) suitable for processing all qualities of wool, mixtures and synthetics has recently been perfected by Société Alsacienne de Constructions Mecaniques (S.A.C.M.), Mulhouse, France. Retaining all the basic principles of its well-known predecessor (the PLB), of which the makers state they have supplied over 10,000 units, the machine successfully completed several months' mill trials and was exhibited at the last Hanover Fair where it attracted considerable attention. It will also be on view for the first time in this country at the forthcoming Textile Machinery Exhibition at Belle Vue, Manchester. Specially designed for high-speed operation it was shown at Hanover combing 58/60s quality wool at 165-170 nips per min., but it is said that higher speeds than this are now being attained in the mill.

Machine makers have tended to produce wider combs in order to obtain increased production, but S.A.C.M. have reverted to their previous width of 320 mm. (approx. 12½ ins.) to produce a narrow, rigid comb with an improved nip, capable of running at high speeds without flexing of the mechanism or of the drawing-off rollers. This feature, the maker's point out, enables high productions while producing a clear, even top. Production varies, of course, with the type of material being treated but at the minimum speeds 26 to 32 lbs. of top/hour can be obtained.

The machine is fed from either laps, cans or balls and a suitable creel can be fitted for any of these feeding methods. The number of slivers may vary according to their weight and the type of creel used, but 24 slivers or a total input of approx 250 g./m. is usual practice. After leaving the creel the slivers enter a guide tray and pass through a new type of quick release triple feed roller unit, consisting of two bottom fluted rollers and one large diameter top roller with a synthetic covering. Roller pressure is easily adjustable and is indicated on a calibrated scale. With this type of feeding accurate pressures can be maintained on every comb in a unit and a ratchet wheel with either 10, 12 or 15 teeth can be fitted to suit the required rate of feed. This means that every comb in a unit will be feeding at exactly the same rate.

Because of the high speeds at which the PERL comb operates it is unnecessary to use a burr knife as the speed of the machine is quite sufficient to force the material deep into the pins without any further aid. The circular comb is fitted with 9 rows of coarse pins and 9 rows of fine pins with a set over of 350 mm. (approx. 13¾ ins.) and a radius at the pin points of 76 mm. (approx. 3 ins.). The nipper consists of two jaws and is of a very robust construction, with a working width of 374 mm. (approx. 14¾ ins.). A stop is fitted which



A view of the S.A.C.M. PERL Comber

prevents the nipper from coming into contact with the circular comb and so prevents any damage to the cylinder or the pins. The bottom nipper is made of special metal so that flexing of this is almost impossible and this ensures that the fibres are perfectly held during the combing operation. The top comb is fitted with a compression pad so that it fits snugly and quietly into position. The fixed comb has set-over of 385 mm. (approx. 15 ins.) and is fitted with a patented cleaning device and embodies two steel blades which effect a double stripping action to the comb blade in a very efficient manner. The circular comb is cleaned by a revolving brush in the usual way.

All strippings from the combs, together with dust and fly from around the combing zone are drawn by a built-in suction arrangement so that no dust or fly can contaminate the combed top; even the noil is cleaner due to this unique device. The drawing-off arrangement is of new design, with sturdily constructed roller ends and housings. The drawing-off roller is 25 mm. dia. (1 in.), with face of flutes 400 mm. (approx. 15¾ ins.). Between the drawing-off rollers, the nip can easily be adjusted from 16 mm. to 35 mm. (approx. ⅝ to 1½ ins.) by a calibrated adjustment mechanism.

The shovel plate has been fitted with a safety roller so that even if a spring breaks the plate cannot drop and damage the pinned cylinder. Safety devices are also employed to avoid laps on both take-off and delivery rollers. Should a lap occur the machine will stop and a red indicator light at the front of the machine comes into operation. A pre-selector counter is fitted for automatic stoppage of the machine when a pre-determined length of combed silver has been deposited in the can.

The standard machine is fitted with cans of 400 × 800 mm. (approx. 15¾ ins. × 31½ ins.), but for special requirements the machines can be made suitable for cans 900 mm. high (approx. 35½ ins.).

A calibrated scale is provided for setting the quadrant. The drive to this is of new design and is fitted with a compensating spring to ensure free and smooth action. All main bearings are connected to a centralised lubrication system and one shot per day is sufficient to lubricate the whole machine.

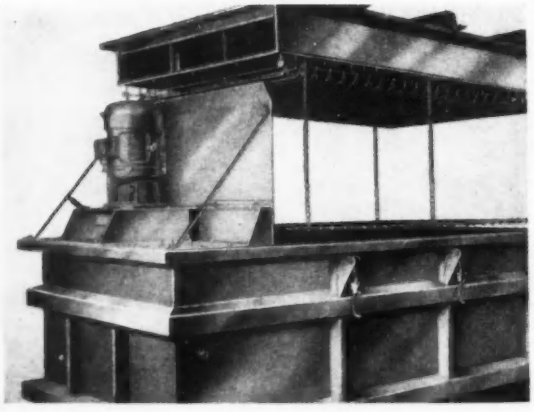
The agents in the U.K. and Eire are Macart Textiles (Machinery) Ltd., Bradford.

Double Stick Hank Dyeing

STATED to be a completely new conception in the design of double stick hank dyeing machines the "Brown-Longclose" system has been developed specifically for hosiery and hand knitting yarns of wool and man-made fibres as well as for dyeing narrow fabrics. Both top and bottom sticks are of an open construction to minimise contact with the yarn and restriction of overall liquor flow and flow through the ends of the hanks. The grid of the bottom sticks has a degree of free vertical movement at any of its adjustable positions, whilst both sets of sticks can oscillate through a wide angle. The combination of these free movements, the maker's point out, promotes level dyeing and prevents stick marking.

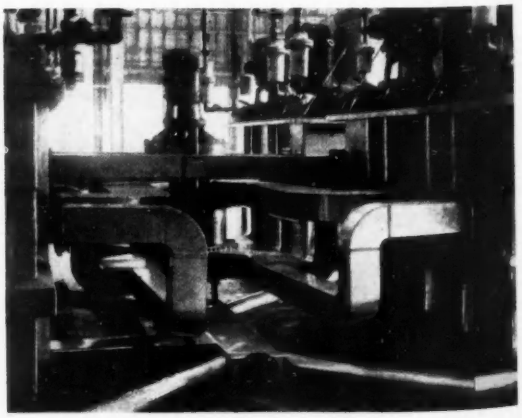
The bottom sticks can be located in a wide range of positions to allow for different circumferential lengths of hanks and also different degrees of shrinkage.

A 2-speed motor drives the special large diameter double-scroll Longclose propeller to allow for varying loads, counts and qualities of material. This type of propellor generates a powerful uniform flow without turbulence, a factor so important for level dyeing without felting and damage to the yarn. Standard equipment includes a 2-speed controller and a fully automatic time operated reversing starter adjustable through wide limits. This enables pre-set cycles of liquor flow and reversals to be accurately maintained through a dyeing. Closed coil steam heating systems with main and auxiliary coil fitted as standard, or special coils for high-pressure hot water heating, are employed. In a new catalogue (H518), Longclose Engineering Co. Ltd., Bowman Lane, Leeds 10, give interesting details of this new system, illustrations of typical installations in operation together with the standard range of sizes. Information is given of the company's wide range of stainless steel hank dyeing machines, the split frame system available on carpet yarn dyeing machines, also the mixing unit employed in coupling pairs or groups of four identical machines.

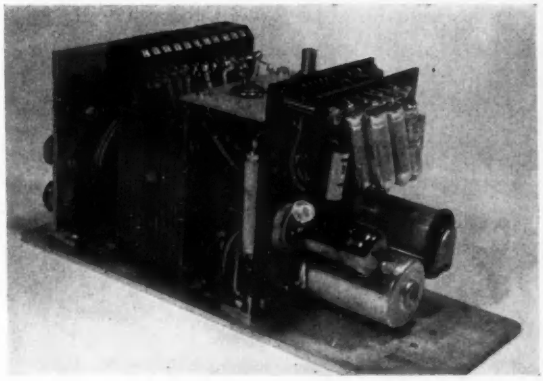


(left) Dyesticks and suspension in the Brown/Longclose system

(right) The Longclose coupling/mixing system



New Optical-Electronic Bobbin Weft Feeler



The Loepfe optical-electronic bobbin feeler for flight feeling

FURTHER developments have been made in the Loepfe electronic bobbin feeler with the result that detection can now be made in full flight, and not as previously, in the terminal position of the shuttle. In practice the following important results ensue:

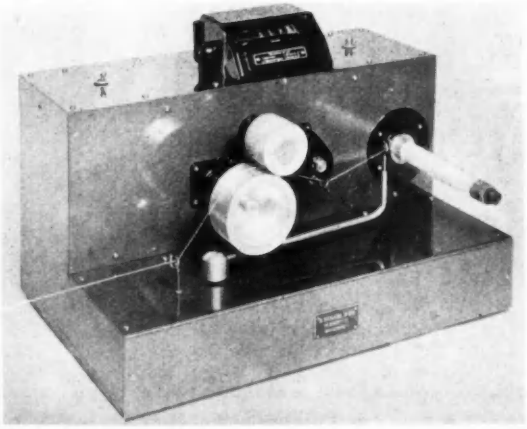
(1) The terminal position of the shuttle has no longer any influence on the function of the feeler; wasted pickers, badly checked shuttles etc. are irrelevant to the feeler action.

(2) The influence of vertical irregularities of the box-changing-motion is eliminated by the function of the new system, to feel before the shuttle enters or leaves the shed, i.e. while the shuttle moves on the race board.

(3) This principle of feeling allows the simultaneous use of different types of weft-carriers, as ordinary bobbins, pirns, supercops, tubular cops etc. without any special precautions. Up to now it was important that in the checking-position, the reflective foil on the weft-carriers was placed in one and the same position; this restriction is no longer necessary, because the reflective material runs through the light beam any way, independent of the place on the pirn or the shuttle it is attached to in horizontal direction.

(4) The new unit LF-3·24 works only on motion, i.e. only on fast moving reflective material. A stationary or an only slowly changing light underground therefore remains inefficient.

The new Loepfe feeler is equipped with an electronic pulse memory storing device which allows for the contingency where the feeling moment does not correspond with the stop moment. This feeling pulse may be stored for any period, i.e. until the cam disc works on the interruptor switch. By adjustment of the cam disc it is, therefore, possible to adjust the stop or the introduction moment to suit any particular type of loom. On single shuttle looms or multi-colour looms which allow the feeling on the single-shuttle-box side, the new feeler works without any mechanical interruptor at all. Specification may be obtained from Crowther Ltd., Britannia Works, Thurmaston, Leicester, the U.K. distributors.



View showing the thread-up of the yarn on the new Renard testing instrument

Compact New Yarn Tester

A NEW instrument designed for use in the routine testing laboratory of a large firm of asbestos yarn producers has been introduced by B. Renard and Co., 18 Barry Street, Bradford, Yorks. The object was to measure the quantity of yarn wound on to paper tubes. This measured quantity was then used to assess the count, strength, twist, etc., thus obtaining the advantages of standard package holders, minimum wastage of yarn and no large and unwieldy packages.

In the actual instrument the objective was achieved with extreme accuracy. The yarn is measured by a very accurately machined drum, the surface contact and feed being assured by the action of a spring-loaded pressure relief. From the measuring drum the yarn passes through a guide driven separately from the measuring drum and the surface speed is controlled by the speed of yarn delivery. When the required amount of yarn has been wound on to the tube the delivery is automatically stopped by the action of a switch in the indicating unit. The indicator may be set to stop at any desired length, correct to the nearest inch.

A feature of the design is a device which switches the machine from the normal speed of delivery to a very slow speed just prior to stopping. This operation reduces the overshoot to such a small amount that it may be neglected and the actual desired length set on the indicator. This feature operates regardless of the pre-set length, and must reduce the risk of error. Without the tube spindle and yarn spreading features, the machine could be used for reeling off yarn for count testing; the yarn falling into a suitable container or even directly into the balance pan. The advantages over the wrap reel for this purpose are stated to be: low cost, small space, facility in use and ability to deal with a larger range of materials.

New Filament Carpet Nylon

Limited production of a new filament nylon yarn—Type 501—for carpets has been announced by Du Pont. The new filament is an additional product for the carpet field and is a supplement to nylon staple for this use. It is expected to result in a broader range of styles and textures, particularly in woven and tufted loop pile constructions. The new product is being produced initially in 1,300 and 3,900 den.

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Static Electrification of Textile Goods and Use of Anti-Static Treatment

Static is not only an irritating nuisance in spinning and manufacturing processes but it can create difficulties during wear of garments. By causing sparks, it can also originate fires in homes and other places

By B. C. M. DORSET

IT is a remarkable point that most of the "static" troubles which have in recent years acquired much increased importance in connection with textile materials arise from the simple phenomenon that when two surfaces are brought together some electrically-charged particles pass from one surface to the other so that on separation it is found that the surfaces acquire a positive or negative electric charge whose magnitude and permanence is governed by the existing circumstances. A rubbing together of the surfaces appears to favour this exchange of charged particles and if the surfaces are non-conducting then leakage away of the newly-established electrification is hindered. Earlier experience of this peculiar kind of electrification has been mainly concerned with glass, ebonite, amber, and other such surfaces but in recent years attention has had to be given to textile surfaces since when yarns and fabrics acquire static charges they make their manipulation during manufacture and processing as well as in everyday use more difficult. The increasing use of synthetic fibre materials which are especially liable to develop static charges and the difficulties thus caused has made it necessary to investigate carefully how such static electrification arises and how it can be prevented. From such investigations many interesting facts have been discovered and much can now be done to reduce the static difficulties formerly encountered when remedial measures were not so readily to hand.

The charged particles referred to above may be electrons or ions but it has not yet been decided what is their exact nature—sometimes they are simply referred to as charged "carriers" but the essential idea is that the static electricity is associated with their possible movement or transfer. If the material carrying static is an electrical conductor then these charge carriers can move along it and pass to any contacting adjacent object which also is an electrical conductor—under these circumstances there is little opportunity for the material to accumulate a charge of static electricity sufficient to cause difficulty in handling it since such static as it acquires can be just as rapidly discharged. But if the material is a non-conductor then the static cannot be so dissipated and it can accumulate until it is powerful enough to jump to other adjacent objects by sparking.

Most textile materials are non-conductors of static when they are perfectly dry. Thus dry cotton and wool can accumulate static just as do nylon and "Terylene." But if the textile material is made of a type of fibre which has a relatively high moisture regain then in its natural air dry state this moisture confers sufficient electrical conductivity to prevent large static accumulations. Cotton and wool have these higher moisture regains but the synthetic fibres have not and so most of the present-day difficulties associated with static are encountered in dealing with synthetic fibre goods.

The moisture regain of a textile material is dependent on the relative humidity of the surrounding air—the higher is this humidity the more moisture is picked-up by the material. Thus it is possible by working with a textile material in air which is given an enhanced relative humidity to avoid static accumulations on goods which in a somewhat drier state are subject to static troubles. In the case of the synthetic fibres, however, it is generally impossible to employ sufficiently high conditions of relative humidity which could be tolerated although they might make the fibres sufficiently electrically conducting to avoid static troubles. It thus has to be faced that with synthetic fibres and also acetate and triacetate fibres there is a strong likelihood of encountering static troubles during manufacturing and processing operations which are carried out under normally dry conditions.

Static is not only a nuisance in manufacturing and processing for it can create difficulties during the wear of garments but it can also, by causing sparks, originate fires in the home and elsewhere. Consideration of all these factors has led to the use of various expedients for counteracting the harmful effects of static. One expedient employed in textile works is to use an electric discharging device to ionise (make electrically conducting) the surrounding air so that static is dissipated from the textile material as fast as it is formed. This is very useful but obviously it is effective only in the works. Thus it has generally become

necessary to render the textile material itself electrically conducting either by applying to it a suitable substance which preferably is wash-fast or by chemical modification such that the fibres acquire a permanent higher moisture content. All this can be expressed by stating that to avoid static troubles it is necessary to reduce the hydrophobic properties of the textile material.

It is believed that the conduction of electricity along a textile fibre is mainly a surface phenomenon and thus in combating static it is required to coat each fibre in the textile material with an electrically conducting film rather than to be obliged to have the conducting substance formed within the fibre substance. The point of interest thus arises as to what kind of substance shall be used for this purpose and how it shall be applied.

Anti-Static Agents

A first consideration shows that it is necessary to have available both temporary and permanent anti-static agents. From the spinning of the filaments which are immediately collected in the form of yarn it is necessary that this yarn shall not accumulate static as it passes through winding, doubling, and other operations up to the stage at which it is converted into woven or knitted fabric. Thereafter the fabric will have to be dyed and otherwise wet processed and in these operations anti-static properties are not required. But in the finishing it is often desirable to apply an anti-static agent so that the articles sold to the public will not be liable to static accumulation.

As regards freshly-made yarn it is usually most convenient to apply to this a composition which is not only anti-static but also a lubricant for the yarn to enable it to pass over guides and tensioning devices without damage. Since such a composition might interfere with subsequent dyeing operations it should be such that it can be removed from the fabric immediately after weaving or knitting by some simple form of washing treatment. This suggests that it is here where a temporary anti-static agent can be of most service. But in the finishing of the dyed fabric it could be most satisfactory to apply an anti-static agent which would be resistant to repeated washing for then the anti-static properties of the fabric and garments made from it would endure through their useful life in the hands of the user. Thus it would appear necessary to use as anti-static agents either a water-soluble substance or one which can be anchored very securely to a fibre surface or which will hold to the fibre by reason of its substantive properties (just as a direct cotton dye is well held by a cellulose fibre material) or which can be deposited in an insoluble form on the fibre surface and held there by use of a suitable binder or a substance capable of topochemically combining with the fibre. All of these possibilities have in recent years been exploited in an endeavour to find the most satisfactory anti-static agents and treatments.

Obviously it is necessary to have some means of testing the efficacy of an anti-static agent or treatment in the laboratory quite apart from large scale testing in the works. One type of apparatus found suitable enables the magnitude of the electric charge produced on a textile material as produced by rubbing it against another material under standard conditions while another apparatus allows measurement to be made of the electrical resistance (the opposite of the electrical conductivity) of a textile material. Apparatus of this kind has been devised in the Jackson Laboratory of the E.I. du Pont de Nemours and Co. in America. (Hayek and Chromey; Amer. Dye. Rep., 1951, **40,** *p.* 164 and 225) Other apparatus for measuring static electrification and electrical conductivity of acetate fibre yarns has been described by Quinteler, Warnee and Sioncke (J. Text. Inst., 1957, **48**, *p.* 28) and by Sprokel of American Viscose Corporation (J. Text. Research, 1957, **27,** *p.* 501). Such measurements are not simple to carry out since static has somewhat unpredictable properties—the degree of accuracy is less than for ordinary electrical measurements since the results obtained can easily be influenced by the existing conditions which are not always easy to control.

The first of the types of apparatus mentioned above and which was devised by Hayek and Chromey comprises an aluminium box within which is a horizontal rotating cylinder to whose surface may be attached six samples of fabric under test and against which may be brought (when desired) in frictional contact a brass strip covered with a piece of fabric which constitutes the material for rubbing the pieces of fabric on the cylinder and thus generate static electricity as a result of this rubbing. The cylinder is of 6 ins. dia. and rotates at 300 r.p.m. per minute—it is geared to an electric motor running at 1,750 r.p.m. The pressure between the rubbing fabric and the pieces of fabric under test can be controllably adjusted.

Immediately before testing, the air in the box is brought to any desired degree of relative humidity and temperature. Then the rubbing is commenced and static electricity is generated on the fabrics. It is arranged that this electric charge induces impulses of potential on the grid of an electronic tube situated as close as possible to the rotating cylinder but without coming into actual contact with the fabrics; these impulses are amplified, detected, and measured, and the magnitude of the electric current thus produced is taken as a measure of the magnitude of the static generated on the fabrics. In an alternative arrangement an oscilloscope is used instead of an ammeter so that the generated static is observed by peak oscillations—this allows different fabrics to be placed on the cylinder to give a corresponding number of peak oscillations and thus the individual charges on the fabrics can be observed in succession during the same test.

Measurements

In any one test it has been found convenient to determine the amount of static developed and the electrical conductivity of the fabrics by the following measurements:

(1) The static charge (actually the current generated in micro-amperes) present two minutes after rubbing.

(2) The "half-life" period of this charge, that is the time required after cutting-out the friction for the charge to drop to one-half of its peak value.

(3) The static charge remaining on the fabrics one minute after cutting-out the friction.

(4) The "full-life" period of the charge, that is the time required for the micro-ammeter reading to drop below unity.

By comparing fabrics which have been treated with anti-static agents with untreated fabric it is possible to determine the usefulness of the anti-static agents; similarly comparison can be made between different types of untreated fabrics. From experience of using this test it has been found that measurement of the rate of decay of the static charges developed, that is the half-life and full-life periods, gives more significant data concerning the electrical properties of fabrics than does the total static charge produced. The following data in Table 1 illustrates the results which can be obtained with this type of apparatus—the relative

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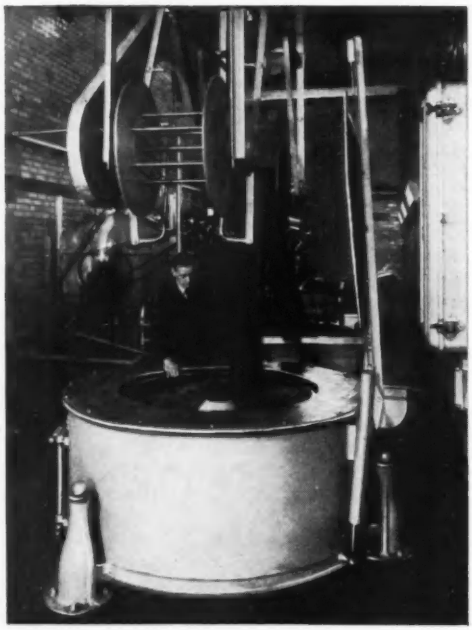

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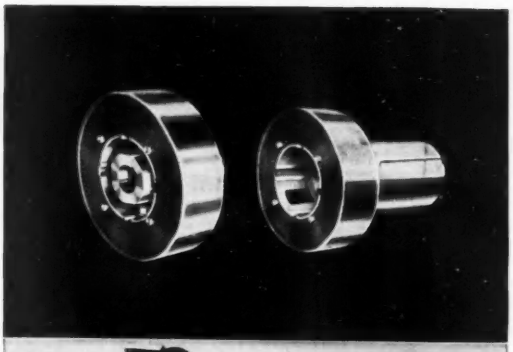

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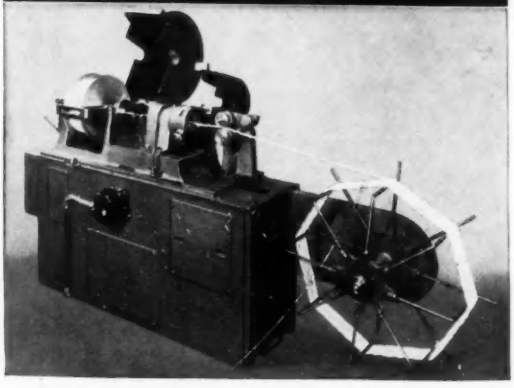

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humidity employed was 25% and a piece of nylon fabric was used to rub with the fabrics on the rotating cylinder.

Table 1

Fabric	Charge generated	"Half-life" period secs.	Charge at one minute	"Full-life" period secs.
Untreated wool	170	—	160	—
Untreated cotton	35	9	—	55
Untreated nylon	145	—	142	—
Nylon + 0.5% of anti-static agent	1	1	—	1
Nylon + 0·3% of anti-static agent	6	2	—	8
Nylon + 0·2% of anti-static agent	48	7	—	45

It is seen that with these particular types of fabric (treated and untreated) and under the dry conditions employed both wool and nylon acquired large static charges while cotton became much less electrified. The use of an anti-static agent on nylon fabric very much reduced its tendency to accumulate static and also promoted a rapid dissipation of such static as was formed on it.

As previously mentioned that generation of static on a textile material is much influenced by the relative humidity of the surrounding air and this is illustrated by actual data given in Table 2, obtained by use of the testing apparatus described above.

Table 2

Fabric	Relative humidity %	Charge generated secs.	"Half-life" period secs.	Charge at one minute	"Full-life" period secs.
Cotton	10	100	390	85	—
	32	3	1	—	1·5
	56	0·5	1	—	1
Nylon	10	165	—	164	—
	32	145	—	135	—
	56	145	23	18	120

These data illustrate clearly how nylon goods which pick-up but little moisture from the surrounding air as compared with cotton accumulate large amounts of static electricity whether or not the air is dry or moist; by contrast the tendency for dry cotton to accumulate static electricity in moderately moist air is almost negligible as compared with this tendency under dry conditions. However if the nylon is first treated with an anti-static agent having hygroscopic properties then the transfer of nylon material from dry air to air which is moist can much influence (lower) its tendency to accumulate static as shown by the data in Table 3.

Table 3

Fabric	Relative humidity of surrounding air %	Charge generated	"Half-life" period secs.	Charge at one minute	"Full-life" period secs.
Nylon + 0·05% of anti-static agent	7	115	—	89	—
	19	66	—	35	—
	30	14	6	—	20
Nylon + 0·30% of anti-static agent	7	139	—	88	—
	19	80	10	3	—
	30	1	—	—	1

The second type of apparatus devised by Hayek and Chromey is complementary to that described above since it does not measure the static charge generated on the textile material being rubbed but rather does it measure the electrical resistance of fabric, yarn, or other textile form. Essentially it comprises two spaced parallel electrodes each of which consists of a stainless steel bar with a flattened underside which can be rested on the surface of the fabric maintained under controlled humidity conditions. A high voltage is applied to these electrodes so that a small current passes via the fabric or other textile material and this is measured with a micro-ammeter. The surface area of the fabric can be measured and with the aid of this the surface resistivity can be calculated. Such apparatus allows resistances over the range 1×10^8 to $400{,}000 \times 10^8$ ohms

Table 4

Fabric	Relative humidity %	Electrical resistivity in ohms $\times 10^8$	Charge generated	"Half-life" period
Cotton	25	25,000	62	2
Cotton	50	1,400	15	1
Wool	25	> 950,000	170	300
Nylon	25	> 950,000	135	500
Nylon	50	> 950,000	165	300
Orlon	25	500,000	150	300
Orlon + 1% of an anti-static agent	25	340	18	1

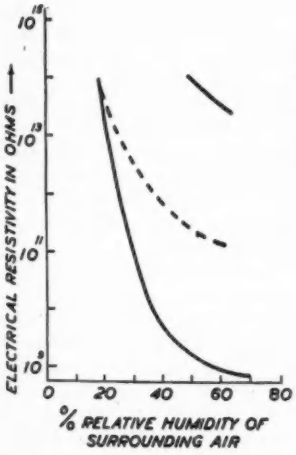


Fig. 1. Curves showing how increasing air humidity lowers the electrical resistivity of (a) Untreated "Dacron" polyester fibre, (b) "Dacron" polyester fibre treated with 0·3% of an anti-static amine salt and (c) cotton

Table 5

Type of anti-static substance	Example	Formula
Inorganic salts	Lithium chloride	LiCl
Organic esters of fatty acids	Butyl stearate	$C_{17}H_{35}COOC_4H_9$
Mono- and poly-hydric alcohols	Glycerol	$CH_2(OH)-CH(OH)-CH_2(OH)$
Amines	Triethanolamine	$N(C_2H_4OH)_3$
Amides	N-dihydroxyethyl stearamide	$C_{17}H_{35}CON(C_2H_4O)_2$
Polyethnaoxy derivatives	Poly dihydroxyethyl derivative of palmitic acid	$C_{15}H_{31}O(C_2H_4O)nH$
Carboxylic acid salts	Stearylamine salt of the mono-stearic acid ester of oxalic acid	$C_{17}H_{35}-O-CO$ (HO—CO) $\cdot NH_2C_{18}H_{35}$
Amine and guanidine salts		$NH=C(NH_2).HOSO_2OC_{16}H_{37}$ $(C_2H_5)_2$
Quaternary ammonium salts		$CH_3-N(C_{12}H_{25})-CH_3$ $(C_{12}H_{25}SO_3)_2$ $(C_2H_5)_2$
Alkyl phosphates	Di-lauryl phosphate	$(C_{12}H_{25}O)_2P(=O)OH$
Salts of alkyl phosphoric, phosphonic and phosphinic acids		$C_8H_{35}-P(=O)(OH)-OH \cdot N(C_2H_4OH)$

to be measured with an accuracy better than 5%. It has been found very useful in so far as it allows measurement to be made of the ability of a textile material to dissipate to earth any static electricity which may be formed upon it. The data (set out in Table 4) obtained with this apparatus and also that previously described show how valuable information can be simply obtained for different textile materials to indicate their relative susceptibility to accumulate and dissipate static.

Effect of Humidity

Such data again emphasizes how effective can be the humidity of the surrounding air in avoiding static troubles in processing textile goods and also the benefit to be obtained by treating such goods with an anti-static agent. Obviously nylon and "Orlon" synthetic fibres are much more liable to accumulate static than say cotton and wool.

It has been mentioned earlier that quite a large number of substances have been found to have anti-static properties and most of these are effective by being able to retain or attract to the fibre surface a suitable amount of moisture thereby lowering the electrical resistivity of the surface. The curves in Fig. 1 show how such a hygroscopic substance can effect this change for the polyester fibre "Dacron" (comparable to "Terylene"). It is to be noted that while untreated "Dacron" has the high resistivity of somewhat over 10^{13} ohms at relative humidity 60% a "Dacron" material treated with only 0·3% of an amine salt has at the same humidity a resistivity of only 10^{9}, that is the presence of this anti-static substance has raised the electrical dissipating power of the textile material about 10,000 times.

In Table 5 are various types of anti-static substances which have been found by Hayek to be effective because of their power to lower the electrical resistivity of fibre surfaces:

An anti-static substance for one fibre may not behave similarly towards another fibre. For example, while the electrical resistivities of "Orlon," "Dacron," and acetate fibres may be much reduced by treatment with an alkyl phosphate the same substance applied to cotton may much increase its resistivity and thus make it more susceptible to static. This is shown by the data in Table 6.

Table 6

Fibre	Electrical resistivities of fabrics in 10^{9} ohms	
	Untreated	Treated with 0·1% of an alkyl phosphate
"Orlon" (an acrylic fibre)	> 1,000,000	18
"Dacron" (a polyester fibre	> 1,000,000	190
Acetate	> 1,000,000	5,000
Cotton	50,000	> 1,000,000

Reference may now be made to some selected anti-static agents some of which are designed so as to be easily removed by washing from the textile material and others which meet the demand of finishers who wish to give textile goods a permanent anti-static finish.

The first product to be mentioned is an anti-static fibre lubricant which is of the non-permanent type since it is designed for application to freshly made staple fibres and yarns so that these may pass easily and without static troubles through the usual manufacturing operations up to the weaving or knitting stage. It consists (B.P. 770,415) of an aqueous emulsion of a lubricating oil containing a condensation product of 1 mole of a fatty alcohol with from 1·5 to 5 moles of ethylene oxide and also a condensation product of 1 mole of a fatty alcohol with from 15 to 30 moles of ethylene oxide. The oil is preferably a low viscosity mineral oil and it should be present in the emulsion to the extent of 3 to 10% so that when the fibres or yarn are treated with this emulsion there is left on them about 0·5 to 1·5% of the oil. The condensation products from the fatty alcohols and ethylene oxide (these are hygroscopic and are the effective anti-static constituents of the emulsion) should each constitute 0·1 to 1·0% of the emulsion. It is possible to increase the fibre lubricating value of the anti-static lubricant at high temperatures by further including in it a small proportion of a fatty acid ester such as ethyl stearate or ethyl palmitate. The preparation of this type of anti-static lubricant is as follows: 21·6 parts of mineral oil are mixed with 5·4 parts of ethyl stearate and 1·4 parts of the first type of condensation product mentioned above made from cetyl alcohol. This mixture is then run slowly with stirring into 69·8 parts of water containing 1·8 parts of the second type of condensation product also made from cetyl alcohol. The resulting emulsion is then passed through a conventional nozzle or plate homogeniser at 30°C. or below so as to ensure that the mineral oil is present in the form of very fine droplets. This concentrated emulsion may then be diluted before use; both the concentrated and the dilute emulsions are stable at 100°C.

Another type of anti-static agent is suitable for the washing of textile goods (followed by hydro-extraction and drying) so that they will be left with anti-static properties—it is thus convenient for launderers and those who deal with articles of clothing. This agent consists of an aqueous solution containing an anion-active or a non-ionic washing or cleansing agent and the product which results from reaction between equi-molecular amounts of an anion-active compound and a cation-active onium compound other then a phosphonium compound (such reaction products are organic electro-neutral salts which have a neutral fatty or wax-like character, are colloidally soluble in water, and have the property of depositing themselves on textile materials from aqueous solutions even if they are used in the presence of surface active compounds).

Washing, etc. Agents

The washing and cleansing agents can be selected from those which are now generally known and available. There are also many anion-active compounds (e.g., alkyl sulphates and alkyl benzene sulphonates) and cation-active compounds (for example, trimethylbutyl ammonium bisulphate, trimethyl-dodecyl ammonium chloride, and hexyl pyridinium bisulphate) which can be together reacted to give the organic electro-neutral salts, which include N-trimethyl-N-decadecyl ammonium oleate, N-dimethyl-N-cyclo-hexyl-N-dodecyl ammonium oleate, and N-octadecyl pyridinium alkyl (C_7 to C_9) sulphates.

A typical anti-static detergent of this kind (B.P. 775,976) suitable for use in laundries is prepared by adding to a solution of a technical alkyl sodium sulphate mixture with alkyl radicals C_{12} to C_{18} about 2% of a cation-active compound first formed by adding chloracetic acid dodecyl ester to dimethyl cyclohexyl amine or by adding this last named cation active compound after its reaction with oleyl sodium sulphate to give an organic electro-neutral salt.

Turning now to these anti-static agents which give a permanent effect mention may be made of a type which makes use of polyacrylic acid for it has long been known that this polymeric substance has good anti-static properties. According to B.P. 791,476 most of those fibres which easily accumulate static electricity can have this tendency eliminated or considerably reduced by a treatment which involves applying an aqueous solution containing polyacrylic acid (this is characterised particularly in containing numerous carboxylic acid groups and also in

losing its solubility in water by heating above 100°C.) and also the sodium salt of oleylmethyltauride, then heating at 120 to 150°C. to bring about the insolubilisation, and thereafter treating the textile material with an aqueous solution of a cation-active compound—it is to be noted that by contrast the oleyl methyl tauride sodium salt is anion-active. It is generally sufficient to arrange that 1% of the polyacrylic acid is left in the textile material. The cation-active compound reacts with any reactive groups present in the baked textile material and it is advantageous to remove any excess of it by a final washing treatment.

Although many different cation-active compounds can be used it is preferred to use quaternary ammonium compounds, particularly stearyl trimethyl ammonium chloride since this least discolours white goods. The corresponding quaternary alkyl pyridinium compounds are liable to produce yellowing.

The function of the anion-active sodium salt of oleyl-methyl tauride having the formula

$$C_{17}H_{33}CON-\underset{CH_3}{C_2H_4}SO_3Na$$

is to act as an anti-adhesive; without its presence the textile material tends to stick to parts of machinery during the drying and heating stage.

Treating Nylon

A typical procedure for rendering nylon fibre goods anti-static is as follows: An aqueous solution containing 1% of polyacrylic acrylic acid and 0·1% of the sodium salt of oleylmethyl tauride is used for treating nylon staple fibre at 80°C. for 15 mins. The mass of fibres is then centrifuged to a moisture content of about 20%, then dried at 60°C., and thereafter baked for 20 mins. at 140°C. The fibres are then treated for 15 mins. in a liquor at 45°C. containing 0·5% of stearyl trimethyl ammonium chloride, then centrifuged, rinsed, again centrifuged, and dried at 60°C. The resulting fibres can be easily carded and further processed into yarn form without encountering static troubles and they have the further advantage of not attracting dust and dirt as do untreated fibres.

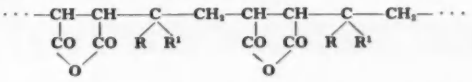
Two very interesting anti-static treatments have recently been described in B.P. 769,014 and 770,766. They are based on the recognition of the fact that to prevent formation of static on a textile material it is necessary to produce on each fibre an electrically conductive layer and that this can most readily be produced by application thereto of an electrolyte and (since the conductance of an electrolyte depends on its ionisation) the presence also of a water film—such consideration implies either that the electrolyte must itself be a hydroscopic body or else that some additional hydroscopic substance must be applied alongside the electrolyte. Such a combination can be very effective anti-statically but it is somewhat difficult to ensure that it is also fast to laundering and dry cleaning.

One method for achieving the aims set out above consists of applying to the textile material a solution containing a polymer of an unsaturated mono-basic acid or a copolymer (containing unreacted carboxyl groups) of one or more unsaturated mono-basic or di-basic acids with one or more vinyl or vinylidene compounds of the type

$$\begin{matrix} R \\ R^1 \end{matrix}\!\!>\!C=CH_2$$

in which R and R^1 are hydrogen, or aryl, alkyl, or similar groups, together with one or more polymeric polyhydric alcohols having not less than three ether oxygen groups per molecule; the textile material so treated is then dried and subjected to a heat treatment say for 15 secs. at 200°C. or for 5 mins. at 130°C. to bring about a reaction between the polymer or copolymer and the polyhydric alcohol so that it is rendered resistant to the acquisition of an electrostatic charge and this property is retained during washing or dry cleaning.

Suitable mono-basic unsaturated acids for preparation of the polymers are acrylic and methacrylic acids. Suitable mono-basic unsaturated for preparation of the copolymers include acrylic, methacrylic, and crotonic acids, while suitable di-basic acids include maleic, fumaric, and citraconic acids. The vinyl and vinylidene components include acrylic and methacrylic acids, styrene vinyl acetate, and vinylidene chloride. Experience has shown that it is advantageous to use an unsaturated di-basic acid such as maleic acid in the preparation of the copolymer since it is then possible to obtain copolymers under easily controlled conditions having the useful molecular structure indicated by the following part of a copolymer chain molecule

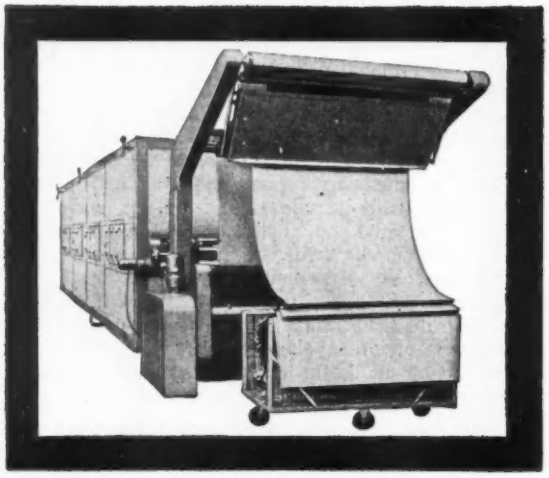


Suitable polymeric polyhydric alcohols include the polyethylene glycols and polyglycerols and their function includes that of cross-linking the molecules of the polymers and copolymers mentioned above thus rendering them highly insoluble so as to be securely held by the fibres treated. The following is a typical procedure for treating "Terylene" goods so that these are made permanently anti-static.

The polymer is first made by heating together 50 g. of methacrylic acid, 3 g. of benzoyl peroxide (a catalyst), and 150 c.c. of benzene for 24 hours at 60°C. The polymer formed is filtered off from the product. 1 g. of the above polymer is dissolved in 80 c.c. of water containing 0·157 g. of anhydrous sodium carbonate and to the resulting solution is added a mixture of 2·6 g. of a polyethylene glycol (mol. wt. about 600) and 16·4 c.c. of water. "Terylene" fabric is immersed in the above solution, then mangled, dried in hot air, and finally heated at 130°C. for 60 mins. The resulting fabric is anti-static and retains this property after washing in a 0·2% soap liquor for four hours at 60°C.

In the alternative anti-static treatment (B.P. 770,766) there is applied to the textile material the polyester resulting from reaction of one molecular proportion of an aliphatic polyhydric alcohol with one to two molecular proportions of an unsaturated aliphatic di-basic acid (preferably in the presence of an anti-oxidant), and then heating to insolubilise this polyester on the fibres and so render them resistant to the acquisition of electrostatic charges. This anti-static finish is also fast to washing and dry cleaning.

Suitable polyhydric alcohols include polyethylene glycols and polyglycerols and the most suitable di-basic acids are maleic, fumaric, and mesaconic acids. The following example illustrates the preferred type of procedure. Firstly, one mole of maleic anhydride and one mole of a polyethylene glycol (mol. wt. 300) are heated together for one hour at 200°C. in a current of nitrogen gas to prevent oxidation. The viscous liquid product is purified from unchanged components by washing with a mixture of ether and benzene. A 10% solution of the resulting purified polyester is applied to "Terylene" fabric and this is then dried and further heated at 130°C. for one-half hour—in this baking stage the polyester (originally water-soluble) is rendered insoluble in water and organic solvents and the fabric is made anti-static so as to retain this property when soaped at 60°C. for three hours.



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Chemical Finishing Treatments

Developments in rot-proofing, water- and fire-proofing treatments are discussed, also processes for improving the handle and appearance of jute materials. In efforts to find new outlets, manufacturers are exploring possibilities of entry into markets for higher priced textiles by extending the range and variety of their products

By S. A. G. CALDWELL, F.T.I.

WAR time and post-war shortages of many fibres and their products provided jute manufacturers with an opportunity, which was readily availed of, to enter markets previously exclusive to products of the cotton, linen, hemp and woollen industries. This involved improvements in manufacturing methods and the introduction of new machinery to produce finer counts and better quality fabrics. It also required considerable research and experiment in bleaching, dyeing and other chemical treatments related to rot proofing, water proofing, flame proofing, etc.

Rot proofing has long been employed in finishing certain jute materials required for use in damp or wet conditions to prevent breakdown of the inter fibre binding substances by fungal and bacterial action, and which would—because of the shortness of the ultimates which range from 2 to 5 mm. in length—eventually result in complete disintegration of the fabric. It is claimed that in suitable conditions of atmospheric moisture and temperature fungi become active at a moisture content of about 17% bacterial action developing in the region of 20%.

Many effective rot proof treatments have been evolved for jute products, the most appropriate for any specific purpose being determined by cost of application and by end use of product. Bryant and Smyth-White, who investigated this problem in Australia, specify the requirements for a rot proof agent for hessian as

(1) Efficient control of fungal and bacterial growth.
(2) No chemical or physical weakening of the fibre.
(3) Resistance to leaching.
(4) Ease of application.
(5) Cheapness and availability.
(6) Non-inflammability.
(7) Finish—quick drying, freedom from tackiness and from objectionable odour.
(8) Safe to use.

In a paper entitled "Jute and the Chemical Industry" read by W. G. Atkins, A.M.I.Chem.E., before the London section of the Society, the author pointed out that rot-proofing of a fibre could be effected in two ways—by modification of its substance, and by impregnation with a toxic agent. The first mentioned method is not much practised in the jute industry for economic reasons, the usual one being to use toxic agents, including particularly certain copper compounds which possess the merit of cheapness, availability, easy application and efficiency.

War time demands for rot-proof jute for sand bags and other purposes were responsible for the introduction of various treatments which, though effective and easily carried out by non-skilled labour, were limited in application because of the substances used. The latter included organic copper salts, cuprammonium liquors and creosote.

Copper naphthenate is probably the most widely used of the organic copper salts for rot-proofing jute. It provides a good measure of protection without weakening the fabric. but imparts a distinct odour to the cloth which excludes its use in treatment of packaging materials for specific purposes where tainting might result. While copper naphthenate can be applied as an aqueous emulsion best results are obtained where a spirit solvent is used. The proofed fabric should contain from 0·8 to 1·0% metallic copper.

Cuprammonium solution constitutes an excellent rot-proofing agent, having also the merit of easy application—immersion of the material for a period of about 15 mins., followed by removal of excess liquid and subsequent air drying. The solution used should not contain more than 2% metallic copper, and the total in the dry proofed fabric should be in the region of 1%. This treatment results in a strength loss of 10–15%.

The use of creosote as a rot-proofing agent involves only immersion, followed by expression of excess liquid, the amount retained being equal to approximately 20% of the dry cloth weight. Owing to retention of the characteristic creosote odour this form of treatment has limited application. The oily nature of the creosote imparts a certain measure of water proofing but increases flammability. A solution of copper naphthenate in creosote constitutes an excellent rot-proofing agent, bearing in mind its limited application because of tainting. The water repelling action of the creosote reduces the effect of leaching of the copper by rain.

Water- and Fire-Proofing

The water proofing of jute canvas, etc., usually involves impregnation or coating with suitable substances in solution to fill up the inter fibre and thread spaces, and/or to cover the surface of the fabric with a plastic water proof film. The materials generally used include waxes, resins, and bitumen. As the water proofed material is generally used for the manufacture of movable covers it is essential that the water proofing agents should ensure flexibility of the fabric, without in any way affecting its water repelling properties.

To obtain maximum serviceability it is advisable that materials to be

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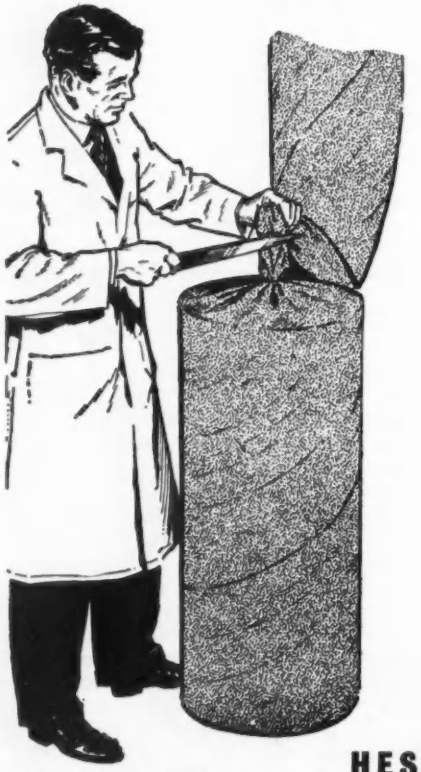

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water proofed should previously be rot proofed, as in the event of damp penetrating at any point, due to a defect in the water proofing film or coating, disintegration of the fabric would otherwise take place rapidly. When both treatments are given it is necessary to ensure that the substances used do not combine or react in such manner as to reduce the strength or wearing properties of the material, or adversely affect the efficiency of the proofing treatment.

Application of waxes or resins is usually effected in spirit solutions or in aqueous emulsions. Bitumen is usually applied by passing the fabric through a molten bath of the substance. It can also be introduced in an aqueous emulsion though the former method is preferable because of difficulty in effecting complete removal of the aqueous medium.

For some uses, such as for brattice cloth, in mines and elsewhere fire proofing is necessary. This involves depositing in or on the fabric substances which increase its resistance to burning, and make it incapable of propagating flame. Fire proofing can be effected by (*a*) impregnating the fabric with soluble deposits, or (*b*) impregnating and coating the material with insoluble deposits. Application of the first mentioned class is simple, being usually effected by immersing the material in a bath containing a solution of a suitable salt, following which the surplus liquid is expressed and the material dried. This treatment is inexpensive, but is unsuitable for fabrics exposed to open air because of leaching, and possible deleterious action of combined sunlight and chemical used on fibre structure.

Effective fire proofing to withstand open air conditions and exposure to rain, sun, etc., requires the use of insoluble products which are effectively retained in and on the fabric without causing chemical degradation of the latter. A wide group of substances for use singly or in combination is available for the purpose. Their relative merits are detailed in a report "Fireproofing of Fabrics" issued by the Department of Scientific and Industrial Research.

Following investigation of this problem a successful fire proof treatment for jute has been evolved by the British Jute Trade Research Association, and made the subject of B.P.785,610. In this the material is treated with an aqueous dispersion containing antimony ortho-phosphate, and a chlorine containing vinyl thermoplastic resin, together with a suspending agent to maintain the antimony ortho-phosphate uniformly dispersed. This treatment is claimed to ensure also resistance to afterglow. A further advantage is that jute fabric so treated retains its fire proof properties after considerable weathering.

The problem of finding an outlet for the products of the industry in view of increasing competition of low priced substitutes in the packaging trade has led jute manufacturers to explore the possibility of entry into markets for higher priced textiles by extending the range and variety of their products. Increased knowledge of the fibre properties, together with improved methods of manufacture made possible by re-equipment, and progress in chemical treatment in the raw and manufactured state to extend the spinning range and end use, have greatly increased the fields in which jute fabrics can be usefully employed. These are now entering into competition with cotton and linen in spheres formerly exclusive to the latter materials. In these markets the lower raw material value gives jute an initial advantage which helps to compensate for the considerable weight loss incurred in bleaching and subsequent finishing treatments, and the modifications of these necessary when processing jute materials.

The chemical composition of jute fibre (Table I) is given by Schwalbe in "Chemie der Cellulose."

Table 1.

Substance	Light coloured fibre	Fawn coloured fibre	Brown Jute cuttings
Ash	0·68	—	—
Water	9·93	9·64	12·58
Water Extract ..	1·03	1·63	3·94
Fat and Wax	0·39	0·32	0·45
Cellolose	64·24	63·05	61·74
Incrusting substances and pectic bodies including lignin ..	24·41	25·36	21·29

Improving Handle and Appearance

The chemical treatment of jute materials to eliminate extraneous matter and improve appearance, handle, etc., is rendered difficult by the composite structure of the fibre strands, the extreme shortness of the ultimates, and the resistant nature of the colouring matter present. Also, a permanent full bleach would require complete removal of the lignin, which acts as a binding medium between the ultimates. This would result in disintegration of the material. Several processes have, however, been evolved by which a high degree of purification can be effected without undue loss of strength. Research in this direction has been stimulated by the post-war need to find new outlets for jute manufactures.

In the paper "Jute and the Chemical Industry" by W. G. Atkins, A.M.I. Chem.E. (already referred to), the author points out that while acid chemic liquors can provide a high degree of whiteness the strength of jute bleached by these means is low because of the action of free chlorine in breaking down and removing the lignin. Better results from the viewpoint of strength retention are obtained with such bleaching reagents as hydrogen peroxide and sodium chloride, but these do not ensure a permanent bleach.

The presence of oil on the fibre from the batching liquid tends to hinder rapid and thorough wetting in wet processing, so that a scouring treatment, or impregnation with a wetting agent is a necessary preliminary to bleaching. If this is resistant to the bleaching solution it may be added direct to the liquor, in which case it is essential to ensure that the latter penetrates rapidly and freely through the material, otherwise uneven bleaching will result. When a scouring treatment is employed for this purpose a mild solution is necessary in order to prevent undue strength loss. For this purpose Ridge and Little, in their paper "Bleaching of Jute for Textile Purposes" recommend treatment for 1 to 2 hours at 65°—70°C. in a liquor containing about 7·5% soda ash on the weight of the jute, the weight loss under these conditions amounting to only a few per cent, while the wet and dry strengths are well maintained.

The extent of bleaching required varies with the subsequent treatment to be given and the end use for which the material is required. For some purposes a light boil in soda ash solution is deemed sufficient. A lightening of colour can also be obtained by treatment in cold or hot solutions of bisulphite. Mineral acid has a definitely destructive action on jute consequently its use in the

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sequence of bleaching treatments must be carefully controlled, processing strengths being usually limited to ½° Tw. in hot, and 1° Tw. in cold liquids.

Jute can be bleached to a creamy white colour by the following sequence of operations:

(1) Boil in 1 to 2% caustic soda.
(2) Sour in a cold solution of hydrochloric acid not exceeding 1° Tw.
(3) Boil in a low pressure kier using a solution containing 3% soda ash.
(4) Wash in warm water.
(5) Chemic in a cold solution of sodium hypochlorite 30 mins. at ½° Tw.
(6) Wash in cold water.
(7) Sour in hydrochloric acid at ½° Tw., wash and dry.

Purification Processes

A purer white can be obtained by further impregnation with a solution of permanganate of potash at ½° Tw., followed by washing and subsequent treatment in a cold bath of sodium bisulphite to discharge the products of the previous operation. The material is then washed and dried.

A simple and inexpensive purification process which is effected without undue loss of strength or damage to the fibre is described in B.P. 542,247. The object of the treatment is to render the fibre more sensitive to bleaching or dyeing, etc., and reduce the susceptibility to damage by bacterial action. The material is first soaked in water in an open tank or kier, the temperature being raised to 90°F. and the water kept constantly circulating. At the end of an hour the water is drained off, the material being subsequently immersed in a bath containing a solution of 1% carbonate of soda and about ½% of a detergent, the temperature being raised to a maximum of 110°F. After 15 mins., during which time circulation is maintained, the material is removed quickly and allowed to drain. This is followed by a thorough washing in water, succeeded by a further bath in 2% "Ammonal" (a batching preparation) and ½% carbon tetrachloride in water at 90°F. for a period of 30 mins., circulation being maintained during the period. The liquid is subsequently run off and the material hydro-extracted and dried.

B.P.533,020 also relates to a process for the purification of jute and similar fibres. This is based on the observation that by successive treatments with a hypochlorite under alkaline conditions and with peroxide, the percentage cellulose content is increased without undue and deleterious removal of essential substances, so that the appearance and spinning capacity of the fibre are considerably improved, the tensile strength and weight loss being at the same time extremely low. In this process the hypochlorite treatment is conducted with a solution of low available chlorine content, not exceeding 3 grams/litre and lasting only about 15 mins., so that no perceptible bleaching effect results. The material is subsequently rinsed and subjected to a peroxide bleach, which is followed by a further rinse and drying. It is now ready for the operations which normally follow the bleaching process.

A process for preparing a white or light fawn coloured fast to light jute, in which bleached jute is subjected to an acetylation treatment is set out in B.P.615,132. The acetylation is carried out by heating the bleached jute with acetic anhydride in the presence of xylene, or chlorobenzine as a diluent, and with sulphanilic acid or p-toluene sulphonic acid as a catalyst.

Woollenised jute is finding increasing use in the manufacture of fancy mixture yarns and in the production of novelty goods. Woollenising is effected by treatment in caustic soda solution, which shrinks the fibres and imparts a springy feel and crinkled appearance resembling wool in some ways, and gives a softer fuller handle. The extent of the effect obtained depends on the strength of caustic soda solution used, which also determines the strength loss. This is offset to some extent in subsequent processing by the considerable increase in yarn extensibility. Novel effects are obtained by its use in conjunction with wool for the production of tweed type fabrics, while woollenised jute yarns may be used in wool fabrics as effect threads in which the contrast is emphasised by different dyeing affinities. Woollenised jute yarns are also used in the production of knitted goods, including scarves, jerseys, etc.

Carpet, Upholstery, etc., Purposes

The increasing use of jute in the manufacture of carpets, upholstery and furnishing fabrics, etc., in addition to those spheres already cited, has necessarily involved the application of colour to extend the range of products and to stimulate consumer appeal. Jute differs considerably from other vegetable fibres, notably cotton and flax, in its reaction to dyes, probably mainly due to its high lignin content. To ensure maximum penetration and fastness to light pretreatment of the yarn or fabric by boiling or bleaching is necessary, though this is sometimes dispensed with where high colours are not essential, or when processing low quality goods.

The affinity of jute for most basic dyes is so great that it is necessary to slow down the rate of absorption to ensure maximum penetration and levelness. Basic dyes, however have poor penetrating power and inferior fastness to light, rubbing and washing. The brilliant colours obtained make them suitable for dyeing unbleached material for certain purposes where clear shades are desirable. Basic dyes are usually mixed in acetic acid and applied in a bath containing alum, the material being entered in a cold bath and gradually brought up to about 200°F.

Penetration by acid dyes is better, as is also their fastness to light. They are, however, inclined to bleed heavily on rinsing the material and their tinctorial value is poor for jute fabrics. They are usually applied in an alum bath of 1% strength, being entered in a luke warm bath and raised to about 200°F.

In their penetrating power and fastness to washing and rubbing substantive dyes are superior to those of the basic and acid groups, the shades obtained are, however, not so bright. Substantive dyes are usually applied to jute with the assistance of Glauber's or of common salt. Fastness to light and bleeding can be improved in some instances by after treatment with copper sulphate and acetic acid.

Still better results are obtained with sulphur dyes with regard to fastness to light and to washing, but care is necessary in their application to avoid tendering. The shades obtained are duller. Dyeing is carried out at the boil with the addition of common salt to the dyebath.

Vat dyes give excellent results on bleached jute on which they give probably the highest degree of fastness to light and to washing. The high cost of these dyes combined with the expense of pre-treatment of the fabric limits their field of application.

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A Conception of Colour and Design in Modern Textiles*

Intelligent understanding of the principles which govern the power and scope of colour and design in fabrics, in the widest sense, provides a standard for the accurate assessment of values. There can be too much concern over price and too little attention paid to quality

By F. E. ELLIS, A.R.C.A., F.T.I., F.R.S.A.†

COLOUR and design are inseparably associated in the aesthetic conception and material expression of textile fabrics and the effective power of colour and design is so wide that its importance in the textile industry cannot be too strongly stressed. The "present" is the sum of the "past," therefore, an appreciation of the influence evolution has had on the development of modern textiles is necessary. Various sources have contributed to this evolution:—

(1) Knowledge of the basic theories of principles of form and colour.
(2) The modification of these theories by practical artistic and technical expression in materials.
(3) Traditional prototypes which serve as sources of inspiration for 20th century interpretation.
(4) Rational craftsmanship in creative design as distinct from clever ingenuity or exhibitionism.
(5) The incongruity of instinctive urge and inherent conservatism in this scientific and mechanical age.
(6) Controls and the unrestrained freedom of expression when controls are lifted.
(7) The introduction and use of synthetic and man-made fibres.
(8) The increased range of pigments due largely to chemical research.

More advanced methods and additional means of expression should improve the standard of the design and styling of modern fabrics, but it would seem that in many instances fabrics inferior in quality and character are produced and unnecessary confusion created by a veneer of imitation. This type of camouflage and other forms of shock tactics do not usually produce good design.

Industrial Design in this Modern Age

There are two basic facts concerned with industrial design: (*a*) man was industrious of necessity before becoming artistic by choice, and (*b*) if beauty of form is wedded to honesty of purpose, the ideal is realised. Decorative design reaches its highest level only when it originates in the material and process and perfectly serves its purpose. The training of the industrial designer must be largely received in close association with the workshop or factory. His education must be obtained through the handling of the machines and materials by means of which he is to express his ideas and give value to his creative skill.

With particular regard to woven textiles, the artist-craftsman is not exclusively a draughtsman, his work forms part of the manufacturing sequence. Any tendency to segregate designing and manufacturing which may have been considered practicable in recent years, no doubt attributable to the advent of the machine in the latter part of the 19th century and its development in this present century, is not only incompatible with the principles of artistic expression and true craftsmanship, but with ordinary common-sense. It is obviously an artificial conception, due to modern conditions of life, to think of the sketch-design as something complete in itself, to be either sold or given to the manufacturer to be pulled together and converted into a practical proposition.

In practice there are standard basic conditions and qualities which have to be recognised by the creative designer and he must work to these standards and produce his effects within the limitations so imposed. Often the designer may have to use materials in stock and plan aesthetic and saleable fabrics with them. Such limitations exercise his faculties and provide tests of his ability.

Intelligent textile design cannot be achieved if the creator of the sketch-design, the producer of the fabric, the fashion stylist and the consumer remain apart, each not concerned about the work, opinions and aims of the others. All individuals working together in close co-operation will give the best results. Craftsmen of past decades worked with knowledge and experience, together with skilful handling, shaping, processing and producing all under control toward the perfect end as visualised at the outset. Today, the artist who draws the design, if he does not actually produce the cloth, should at least know how to construct it.

Industrial Design Education

A notable fact of recent times is the gradual improvement in public taste which is no doubt due to the provision of more universal facilities for the higher forms of education. This is of the utmost service to the modern designer and provides him with opportunities to express his ideas in truly tasteful productions. At the same time, it introduces the more difficult problem of wider individualism in customers' choice and to meet these conditions the designer must be very resourceful and alive to these more decidedly varied and advanced opinions; he must be prepared to "follow the trends." But these trends are still largely created by the designer and manufacturer and being more alive to the value of the good designs and therefore more appreciative when they are displayed for their selection, the general public are largely guided by the quality which can only be supplied by the trained knowledge of the experienced designer and technician and produced by the manufacturer. On the other hand this alertness to change in so-called "public taste" is often merely alertness to "public fancy" which is exploited purely from the standpoint of increased "selling" power and frequently at the sacrifice of quality.

Modern design education has two main aims, comprising knowledge of good design and the development of creative ability in (*a*) individual and (*b*) collective designing. Industrial design training includes the following:—

(1) Non-vocational (intelligent understanding and appreciation).
(2) Vocational (the acquisition of knowledge plus executive ability).
(3) Individual design (the expression of personal taste and ideas).
(4) Collective design (the interpretation of industrial conditions and requirements).

Neither non-vocational nor vocational training are concerned with fashion or trend and individual designing conforms with principles of artistic expression and fitness for purpose and should lead rather than follow industry. Collective designing is more universal in character and of wider application and is largely controlled by market value and demand. In regard to all forms of wearing apparel or soft and hard furnishings, there are (*a*) builders of decorative fabrics, (*b*) creators of decorative effects in fabrics and (*c*) designers of decorative effects on fabrics; (*a*) and (*b*) comprise true textile design whilst (*c*) is design applied to textiles.

The most successful industrial designer neglects his personal preferences and endeavours to produce designs with the widest possible appeal; but there need be no violation of the principles of good design in either individual or collective work. It is much easier to do as we like

* *From a recent paper to Keighley Textile Society.*

† *Senior lecturer in Textile Design and Colour, Institute of Technology, Bradford.*

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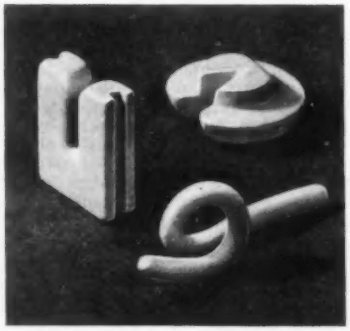
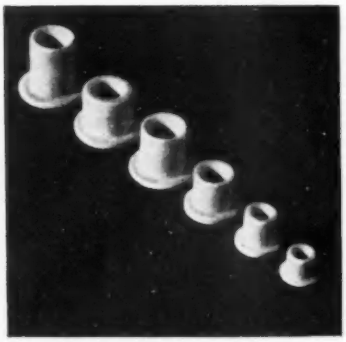


complete success where other materials would wear or break. Its normal velvet finish is so



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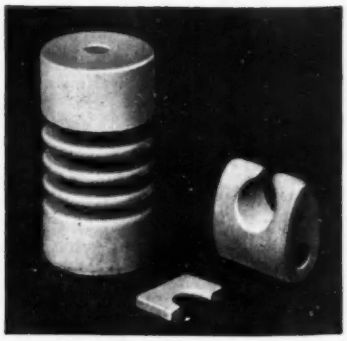

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than to do as we are told in designing as in anything else, but it is necessary for the mind of the designer to be disciplined; he must learn to design to conditions, which involves a more difficult type of study and experience. Experience is a good teacher and instruction forced upon the mind by others is all too often indifferently received and consequently not easily retained.

Suggested Order of Training and Study

This may be conveniently divided into three stages of development:—

(1) The first or preparatory phase which includes study of the rudiments or the grammar of colour and design in textiles. Analysis and criticism; study of the best examples of work, having special regard to structure and form, and a comparison made with some of the worst examples. The student will thus learn the language by means of which he will be enabled to express himself.

(2) The second or intermediate stage occurs when the student has gained the ability to express himself with reasonable fluency and accuracy. The student should then set about collecting ideas for design by personal study and observation of natural and artificial objects, by analysis of form rather than pictorial imitation or expression, in a search for shapes, pattern treatments and textures suitable for decorative fabrics. In addition, to obtain knowledge of past achievements, traditional and modern fabrics should be analysed and related to the Schemes of Dress or Furnishing for which they were designed.

(3) In the third phase the student should be encouraged to regard his relationship with his teacher, not as master and pupil, but as a co-studentship during which both are working toward the same end; in other words they become friendly rivals. It is however, only by inventiveness, creative effort and self teaching that the experienced student may become a master in his own right. Of course, this partnership may occasionally be made difficult by the younger student forgetting his indebtedness and adopting a falsely superior attitude; in the words of Oscar Wilde "The young are always ready to give those who are older than themselves the full benefit of their inexperience."

By constant observation; study and analysis, the mind of the designer is furnished with ideas, and his hand becoming skilled by practice, he works with easy spontaneity; also conscious of difficulties overcome in reaching pre-eminence, he is happy to share his knowledge with those who have followed the same road. Experience, however, cannot be truly imparted. It is largely an individual matter, and some, having no definite aim, are unable to profit thereby.

No doubt the ambitious student will make mistakes, but if these are recognised and corrected, the information is retained and progress achieved. This is summed up in a saying of Confucius, "A man who has committed a mistake and fails to correct it, is committing another mistake"; and again in the words of Jonathan Swift, "A man should never be ashamed to own he has been in the wrong, which is but saying, in other words, that he is wiser today than he was yesterday."

Art, Workmanship and Labour

Understanding, vision, and imagination are the raw materials of beautiful creations. There can be no real understanding apart from sympathy, and the designer must be in sympathy with his subject and the technique of his material expression, but although textorial difficulties should not be shirked, it is possible to be a technical expert and yet be blind to beauty of form; for instance, trained guides to our glorious mediaeval abbeys and churches are well able to gabble about the historical setting, "date" every architectural detail and yet have no clue to the devoted spirit of the original craftsman.

On the other hand to limit the word "art" to this aesthetic essence is equally erroneous as history proves time and again; art is also work, production and labour. It is the substance as well as the expression; the labour, as well as the emotion; the service, as well as the delight; and in all design, including textiles, these two aspects are complementary and cannot be considered separately except to the detriment of both.

Civilising Influence of Colour and Design

There is a power for good in all colour and design in fabrics and all creative production should be treated as a service to mankind. If it fails in this respect it fails in its essential purpose. Cloth is a necessity of life. A fabric is a structural web of yarn which functions as protective covering in dress or furnishing; the designed form of a fabric should beautifully and charmingly express its practical use and give pleasure and delight not only to its possessor but also to the casual observer.

When a conceived idea is given material form it ceases to be the exclusive property of its creator, it is automatically shared by any onlooker, and its influence for good or ill may be very wide. This principle is common to both schemes of dress or furnishing, for in either case the owner shares his property. It should therefore not be difficult to assess the artistic value of this aspect of creative work but like most influences for good it can be violated as designers and manufacturers realise to their cost.

It would appear foolish, either by excessive language or lack of clear definition, to make art into something of an addition when it is actually the designed form of the object itself. Can it be clearly defined where utility ends and design or pattern begins? Where lies the distinction between serviceable and aesthetic, between science and art; between structure and design? It should not be necessary to surround science, art or technology in mystery and cloak them in language beyond ordinary human intelligence; to do so merely tends to widen the gap between any important development in these services and the industry.

Form in Structural Texture

This has an important bearing on the designer's conceptions. His outlook and ideas must be brought into line with the basic characteristics of raw materials, yarn structure, weave, cloth structure, dye and finish. These, not pencil, brush, and paper, are his means of expression and must largely govern his thinking and planning, type of pattern and colouring. He starts with a mental picture of the three-dimensional form of the finished fabric and then builds his structural design to that end.

In conjunction with these essential technical conditions, there are the constructive principles concerned with the end-use of the fabric as a related part in the ultimate scheme. For example, the yarns and methods of interlacing warp and weft can be variously treated to produce different effects. A sateen weave used singly to give either warp and weft surface character may appear entirely different as a texture in association with other weaves. In composite weave styles each weave is used to express form as texture effects in harmony or contrast which involves other structural principles. Modern thought on fabric design emphasises the use of yarns and weaves for their texture value rather than as a medium for the expression of complicated drawn form, and fabrics of this type are more economical to produce and also more suitable for general use.

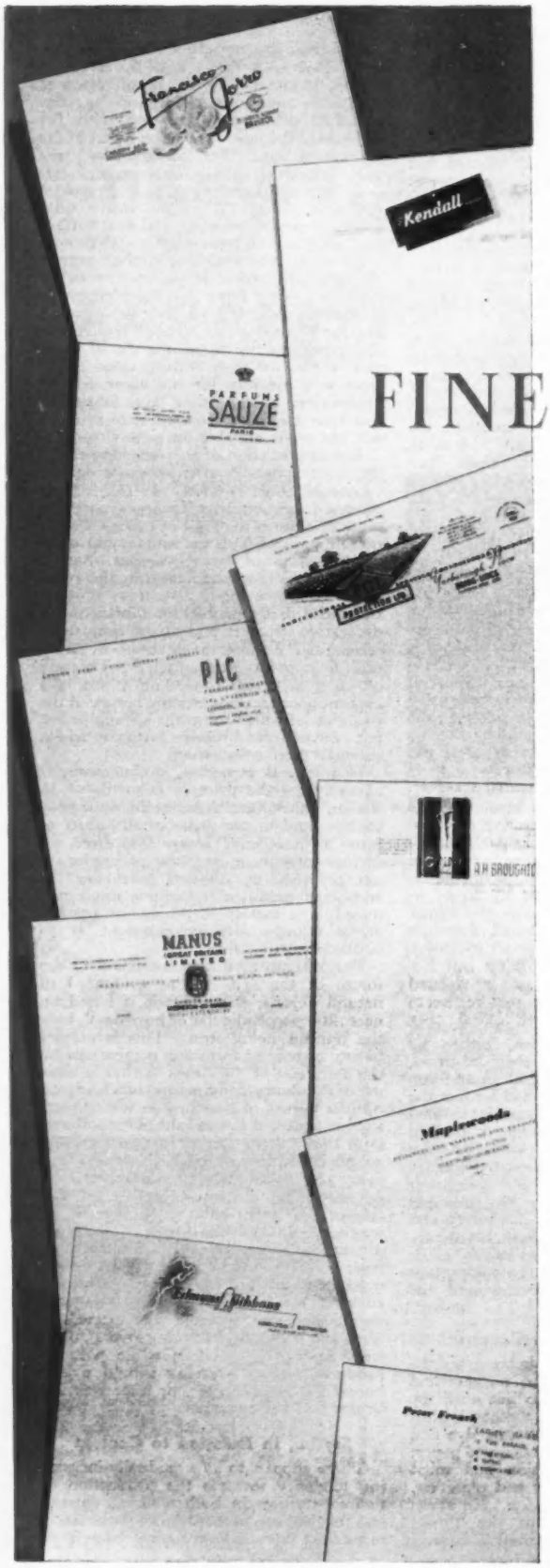
Full appreciation of this development as the right approach to true textile design, i.e. *woven design in fabrics* as distinct from *printed design on fabrics*, becomes more and more evident in the light of experience. It not only agrees with the artistic and technical aspects of woven design, but is suggested by and conceived in the principles of weaving. By this broader treatment it is possible for fabrics to be decorative in effect and at the same time serve their purpose as accessories rather than focal points in themselves. This use of yarns and weaves in simply arranged areas not only accentuates the beauty of the materials of which the yarns are comprised but introduces broken surfaces which enhance their colouration.

Geometrical structure, architecture or anatomy are the primary elements of all design, either natural or mechanical; they are the fundamental bases of all beauty of form or decorative essays and need no further embellishment; these principles are not governed by fashions or modes. If additional ornamental features are introduced, it is merely to provide variety, to create affinity with environment or to harmonise with force.

Designs must be accommodated to the forces of the age, but as evidenced in natural objects, the aesthetic is based on necessity, perpendicular or horizontal, only the upright being firm. This structural beauty of natural form was emphasised by the architects of the classic period in their use of stylobates, columns and entablatures. Similar beauty of structure in furnishings, such as tables, chairs and the like, combines both these directions; in human form the accent is on the vertical, whilst in animal form the horizontal is emphasised. Of necessity, the structural basis of woven fabrics is warp and weft, which lie longitudinally and transversely in the loom or mainly vertically and horizontally in wear. Of necessity, all aesthetic design must be in harmony with this underlying construction and processing; patterns designed before weaving are formed in warp and weft (stripes or crossovers), or in warp and weft (checks); while patterns produced during weaving should evince honest woven character, or after weaving honest printed character.

Styling in Relation to Context

There appears to be a gradually increasing tendency towards the production of figured stylings in both weaving apparel and furnishings, perhaps more particularly in printed fabrics; hence there is an even



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greater need for knowledge and appreciation of the principles of artistic taste and the exercise of thoughtful care in their execution. This understanding will have a restraining influence on the production of mere vulgar displays of discordant motif-forms, for nothing can be more distasteful than the unrestrained grouping of excessively figured fabrics, and other objects in which the motif-forms have nothing in common with either material, process or situation. Of course, people cannot be compelled to appreciate that which is beautiful and fitting in personal dress or the furnishing of a home, and any attempt to enforce cannons of good taste would in all probability create either rebels or hypocrites, but helpful guidance can be supplied by teachers and designers if their efforts are directed to this end.

Dress materials or suitings cannot rightly be considered apart from their human context, or furnishing fabrics apart from the structure of the furniture; architectural background, and the human element for which they should provide a suitable setting. The true quality of a suiting or dress material can be entirely spoilt if it clothes the wrong person or conversely fails to fit with the personality and colouring of the wearer. Relationship-value is a high level factor in textile designing.

Designs for the purposes of dress are necessarily smaller in size and of increased scale as compared with most furnishing styles where bolder designs with larger areas are possible. This is in accord with the law of proportion, i.e. the chosen type of motif and pattern to be suitable for the area or areas of display. This rule may be broken in a scheme where large curtainings may be practically plain, a broad treatment which creates the impression of spaciousness and so forms a suitable background for the more solid pieces of furniture. The rule is not broken, however, for actually the plain texture will emphasise the size and area by not cutting it up with pattern.

If it is considered necessary for pattern or styling to conform to conditions of structure in cloth, it is equally clear that the type or types of motif-form can only be decided in relation to the end-use and purpose of that cloth. To be unconcerned about aesthetic fitness is a contradiction of the higher forms of education. If scientific and technical research concentrate on exercises in the basic structure of natural materials or on the production of many varieties of synethetic and man-made fibres and neglect essays directed to the improvement of quality in fabrics, surely they are not giving their greatest service. Is this a justification of artistic training and the point where study and understanding of aesthetic values find their fulfilment?

All adventure in design is built on the necessity of structure and, as good design is built on previous achievements and experience, it is evolutionary not revolutionary. The influence of necessity or the recognition of force is fundamental and not subject to capricious fancy or changing fashions; creative design is a living force and its styling or cloak unites it with conditions, influences and customs of the age. Structural force can be traced in both natural and artificial objects and is resolved by three lines or planes vertical, horizontal and diagonal; the diagonal is the weakest and invariably dependent on the strength of the other two.

In natural form the upright is firm as opposed to the law of gravity, but only when related to the horizontal or supporting surface, e.g. an erect human being, a tree, or in artificial objects composed of walls and either a flat or diagonal roof. Thus the two lines arranged in direct opposition produce right-angles which give the strongest composition; as angles become more acute the effect is weakened. The standing human figure (front view) is perfectly upright and symmetrical which conveys the impression of firm dignity, and the symmetry is only disturbed by bodily action; even then balance must be maintained unless all pretence of uprightness is abandoned. The side view is also upright, but asymmetrical in character. In animal forms the vertical is subordinated to the horizontal (suggesting the subjection of a lower order) but the right-angle is still present except during muscular action.

The principle of necessity in the structure of woven fabrics is warp and weft, which lie longitudinally and transversely in the loom or mainly vertically or horizontally in wear. But although the fabrics are upright, horizontal, or both, they are dependent on some supporting force. Subsequent styling may vary and more than one warp and weft may be combined, but the right-angular construction remains.

All aesthetic design of cloth or pattern in cloth must be in harmony with force; patterns designed before weaving are formed in the warp *or* weft (stripes or cross-overs) or warp and weft (checks); whilst patterns produced during weaving are (twills and diagonals) or weave textured interlacements of threads; after weaving the styling is produced mainly by shrinking, raising or printing. Warp and weft relationship in extra or imitation extra warp, extra weft or imitation extra weft, double plains and tapestries necessitates particular pattern styling for full effectiveness; extra warp (weft-way), extra weft (warp-way), extra warp and weft (diagonal).

The following are further examples in which the styling is related to utility and necessity, or is arranged in harmony with, or in opposition to, the law of force.

(1) A small scale or imbricated pattern on vertical surfaces, (*a*) an upright wall (supporting) or (*b*) a hanging curtain (supported) should change its direction.
(2) A Jacobean chair leg is not in harmony with force because it is a means of support, and yet its design is in the form of a rope which in principle needs supporting.
(3) A festoon or snag design, which swings from one support to another, therefore violates force if broken in the centre—the broken ends would automatically drop.
(4) Vase decoration in the form of borders which originated in the metal bands used to strengthen earthen vessels as a protection against breakage.
(5) The field of a shield in heraldry is divided into ordinaries, which were suggested by repairs to wooden shields broken in warfare.
(6) Letters of the alphabet are designed forms which have an affinity with other decorative form and repeated pattern.

Numerical Basis of Colour

Any colour theory and any system of colour manipulation substantiated by practical examples, must seek to satisfy those final arbiters the eye and the mind of the individual. Experience shows that the numerical principle, which is the foundation of both linear (two-dimensional) or planar (three-dimensional) form and the planning of repeated pattern, is not confined to them. By analysis, it is also evident in natural colour phenomena, composite colour structure in textile fabrics and the light produced luminous colour-rays of varying vibrations and wave lengths and their reflected counterparts in pigmented materials.

(1) Light is colour.
(2) Light contains colour.
(3) Light produces colour.

The colours of the spectrum which are the refracted part-images of light, can be classified as primaries and secondaries; the reflected or pigment expressions of these are the well-known single hues or primaries, red, yellow and blue, the three compound or secondary colours, orange, green and purple, and the even more compound coloured greys or tertiaries, brown, fawn and olive green; here the numerals 1, 2, 3, are self evident.

Tone and hue, the two values possessed by all individual colours denote their position in (1) the neutral or tone scale, (2) warm or red scale, or (3) the cool or blue scale. These scales lie between two extremes, (1) neutralised light or white to the negation of light, darkness or black, (2) yellow to violet by way of red, or (3) yellow to violet by way of blue.

Of equal importance are the three constants concerned with colour composition namely, purity, luminosity, and hue. The only material colours with any claim to purity are the self-colours or primaries; luminosity is governed by light absorption and reflection and regulated by contrast; whilst hue is controlled by chromatic absorption or reflection and is produced by different ratios of two primaries as illustrated in hue scales, e.g. yellow through green to blue.

Further sub-divisions of colour are referred to as (1) tints, (2) normals and (3) shades; tints are produced by the additive method, i.e. the addition of light or white to the normal colours, whereas shades are produced by the subtractive or negative method, i.e. reducing the light content by darkness or black.

The respective natural sources from which pigment substances or dyes are obtained are again in three classes namely, animal, vegetable, and mineral each possessing distinct properties and attributes within themselves, either transparency or opacity, and selective affinity with textile materials.

Other numerical factors affecting the use of colour are (1) quantity and (2) quality, both of which are closely allied to (1) area and (2) proportion. By increasing the area of a colour a more effective display of that colour is produced by quantity, but the value of a colour can be increased by reducing its area in juxtaposition with other colours or neutrals. For example a fabric piece-dyed yellow will obviously be yellow by mere quantity, but on the other hand, single or grouped yellow threads woven into a black or navy-blue cloth will be given additional quality value in their reduced areas by tone or colour contrast.

Harmony, Contrast and Discord

All practical expression of colour in materials must be preceded by careful study of its source and meaning, otherwise confusion will occur between cause and effect and failure to comprehend the influence of material, texture, position, methods of production and conditioning imposed by the machine and industry. The

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same colours or dyes in the hands of different individuals may result in effects varying in character due to consistency and method of saturation. This suggests that the reason for faulty or bad colour lies in the way the dyes are used rather than in the quality of the dyestuffs themselves. Moreover, an intelligent and balanced colour-sense is necessary in order to form a true mental forecast of the final result.

Of the three main types of colour expressions "harmony" is the most closely allied to the principles of weaving and contrast or discord the most difficult to achieve. Solid tone or hue is impossible on account of the relationship between the texture of the fabric and light. A cloth dyed one colour will be mono-chromatic, but if composed of very lustrous materials, may become poly-chromatic in conjunction with its surroundings. Colour modification involves a harmonising of the component tones or hues and in woven fabrics methods of yarn and cloth construction are decidedly harmonising factors; in fact to produce either colour contrast or discord in woven cloth presents difficulties and is only possible with warp and weft surface weaves in such types as poplins, satins or double-plains. Even in these fabrics, the colour character is influenced by the play of light.

Harmony may be an analogy of tone, hue or both tone and hue; or a harmonising of harsh or crude contrasts. The main principles or methods of harmony are derived from the analytical study of nature and may be summarised as follows:—

(1) Analogy by gradation or the gradual blending of one tone or hue into another is evident in natural forms and is present in many piece-dyed or cross-dyed fabrics.

(2) Analogy by quality—the change from a pure spectral colour through tints or shades of that colour (tone grading —standard areas but varied tones).

(3) Change of quantity—varying areas of one colour from large to small (quantity grading — standard tone varied areas).

(4) By both change of quality and quantity in area and tone or hue, or a smaller area of a normal colour balanced by a larger area of a tint or shade of another colour (tone and quantity grading—varied tone and varied area).

(5) The addition of a colour which will break up tone or hue contrast between the two neutrals or colours. A little of the one colour added to the other will harmonise a harsh contrast or the addition of a small amount of a third colour. This method may be used in range-making, various tones or colours which contain something common to all.

(6) Harmony produced by the addition of one of the five harmonises—white, grey, black, gold or silver—either by mixture or as separate areas or outlines.

(7) A dominant hue or neutral will harmonise a number of associated colours. A group of colours seen through a coloured piece of glass, or a striped warp composed of many colours may be harmonised by a neutral weft, arranged to cover 50% of the warp by the use of plain weave, or a coloured weft not included in the warp design.

(8) The interchange of two tones or hues; double-interchange of four tones or hues will harmonise the respective colours.

(9) Counterchange—two colours identical in shape and area gradually reduced in size; a pattern in small areas; or both colours increased or reduced in tone.

(10) Surfaces receding from the source of light; the colour in an object in the round; broken textures similar to crepes, moquettes, loop or cut pile or raised fabrics.

(11) By outlines or the separating of flat colours by a dark colour or black and a second outline inside the first in a lighter tone of the same colour. This can be arranged in coloured stripes and give a soft velvet-like effect.

(12) By broken tones or hues as produced by mixtures; by the inter-weaving of threads, cross-dyeing; de-lustred and filament rayon; staple rayon and filament rayon; spun-dyed fibre yarns and the resultant colourings.

Contrast

All natural colour is grouped by sunshine or shadow, the luminous or sun-colours possessing life and warmth, the non-luminous or moon-colours in cool, deep tones. These two large groups form the main basis of contrast, the one group being complementary to the other. As previously mentioned, associated tones and hues react on each other and true contrast is only possible between colours which intensify but do not change in hue quality. There are various forms of contrast including tone, neutral, complementary, chromatic, simultaneous and successive, or contrast of tone and hue. To obtain any form of contrast, either of tone or hue in woven cloth, the areas of each must be sufficiently large and not too broken in texture. Therefore, two-tone or two-colour effects cannot be produced in end and end or pick and pick styles, because the tones or hues so arranged will become compound in character; white and black threads will produce a grey cloth and yellow and blue threads, a green cloth. Further, a solid yellow warp and a solid red weft, woven plain, will result in an orange cloth. Distinctive twist or folded effects in yarn structure depend on the combination of neutrals with colours. To obtain any form of strong contrast the areas must be sufficiently large as in some figured styles, tartan checks, double-plains or extra or imitation extra warps and wefts. Even then it is usually better to subdue the full opposition of tone and hue. In most instances, particularly where lustre yarns are employed, two-colour contrasts are more likely to produce multi-colour effects.

Discord

It is not generally realised that one colour can be discordant and poor in quality or that a series of yellows, reds, or blues can be in discord when used together. Some of the worst forms of discord can occur in arrangements of the more negative or unobtrusive colour-greys such as browns, fawns, dark blues, and greens. Harsh or crude effects are forms of discord and they can be present in a range of browns or in any of the quieter mixtures, just as easily as in combinations or the more vivid hues. Colours that are not in their true tone and hue relationship are the underlying cause of distasteful effects. An easily comprehended form of discord is instanced if red of a deeper tone is used with crimson or if a light tone of crimson is associated with true red. Of course, the strength of the discord will vary according to the proportionate use of the colours concerned. A small note of discord is very useful in planned colour structure. A good colour scheme consists of harmony, contrast and discord; the main areas should be in harmony, the secondary areas in contrast, with a small area of discord to give it life. For example a suiting in tones of dusky blue with striping threads of dull orange and very fine threads of pale violet.

Conclusion

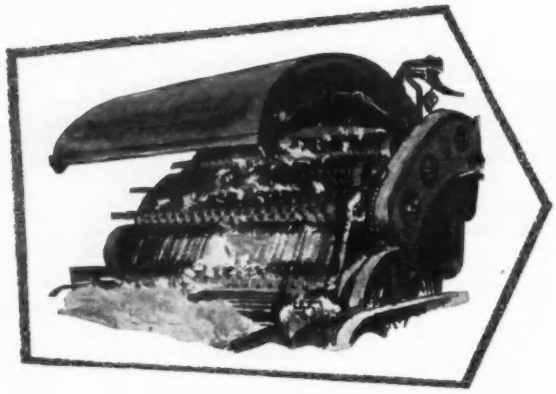
It has been said that every science or art required not only special works of learning, but synthetic exposition, written and spoken. In such exposition, general ideas are of the first and facts of the second importance, whereas in all forms of erudite instruction every hour of synthesis should be based on a year of analysis. This hour does not come to all men; but when it comes, it is well to profit by it, and better still, to make others profit. Inspiration and imagination are not a substitute for intelligence and intellectual analysis should never be regarded as the end instead of the means.

Today, scientific research, artistic creative power, technical development and industrial achievement should keep pace with each other. To this end, and in the interests of national efficiency, our efforts should be directed in an endeavour to improve the all-round quality of our products; for a complacent assumption of perfection in the quality of our productions would suggest the impossibility of further progress and prove a prelude to retrogression.

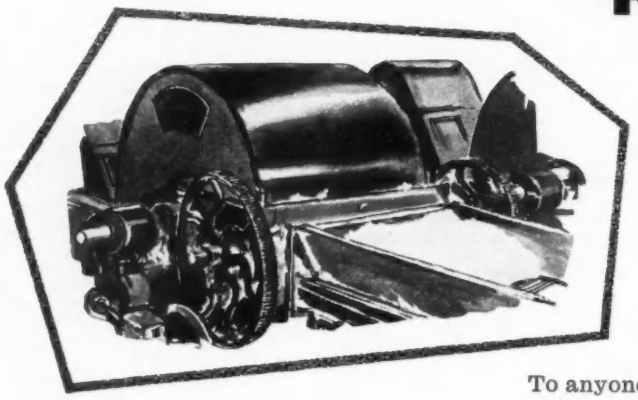
Intelligent understanding of the principles which govern the power and scope of colour and design in fabrics, in the widest sense, provides a standard for the accurate assessment of values. There can be too much concern over price and too little attention paid to quality. To quote a very old saying "quality always tells" is a truism it is well to observe, for although face-value and a veneer of popular appeal may sell a cloth, it is aesthetic merit and lasting quality which retains custom, and encourages repeat orders. Of course the economical aspect of design and the production of fabrics must be considered, and if the material and styling of fabrics are the best that can be made in the time and at the price, a general raising of the standard will follow.

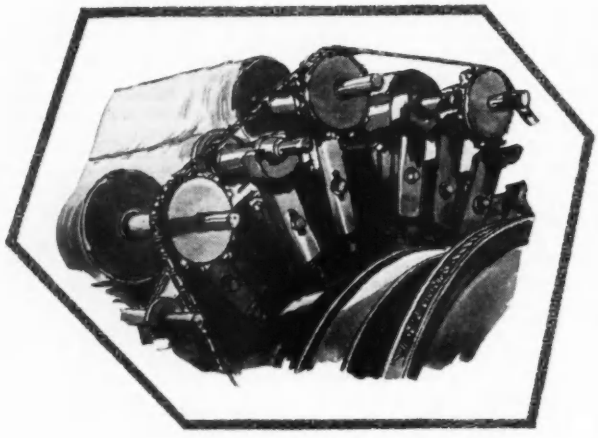
Australia's Wool Earnings

Australia's wool cheque for the 1957-58 season, ending June 30, was £A336,771,000, compared with £A482,860,000 in the previous season. Largely because of drought, fewer bales were offered for sale during the past season, the total being 4,374,700 bales, as against 4,886,500 in 1956-57. The average prices of wools in the grease was 62·27 Australian pence per lb., compared with 79·66d. the previous season, and for scoured the average was 85·92d., against 101·59d. Receipts into store during the season amounted to 4,506,800 bales. Shipments for sale abroad totalled 23,235 bales, and at the end of June 108,900 bales were in store awaiting disposal.



DO YOU RECOGNISE THESE?





To anyone in textiles a rag grinder, a tenterhook willey and a carding engine are so familiar that they are hardly worth a second glance. But they are worth a second thought—for friction and foreign matter in these machines have been the starting point of many a disastrous fire.

Today, however, the fires that they cause in raw materials and fly can be stifled in seconds with a fine cloud of dry powder. Electrical and oil fires can also be killed completely, before they take hold. *Today is the new age of Nu-Swift.*

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(TMF9)

Finishing Stockings made from Crimped Continuous Filament Nylon Yarns

PREVIOUS service bulletins issued by British Nylon Spinners have given suggestions for the finishing of half-hose made from conventional and false-twist crimped continuous filament nylon yarn, respectively. Basically, the same technique is used for finishing crimped stockings, but there are some differences, as the finishing of stockings is a specialised process requiring more care than the finishing of half-hose. Crimped stockings are knitted in a variety of gauges and deniers in singles and two-fold form, which determine the bulk and elasticity of the stockings. These constructional differences, while appearing large, do not necessarily alter the finishing procedure. The technique described now is basically correct for all types of crimped stockings knitted from either conventional or false-twist yarn.

Relaxation

It is essential that stockings are subjected to a relaxation treatment; this can be carried out in steam at atmospheric pressure or, alternatively, by a low temperature scour. For relaxation in steam, the stockings are laid on trays in a steam box or cabinet, or loosely bundled together by the toes or welts and suspended in the steam cabinet. The treatment should be of sufficient duration to ensure thorough and uniform penetration by the steam, and is dependent upon the number of stockings being relaxed and the size of the cabinet. Overloading should be avoided, thereby ensuring free access of the steam to all the stockings. In order to obtain complete relaxation of the stockings, it is important to introduce the steam into the cabinet gradually. Sudden maximum injection of the steam will have a setting effect on the fabric and will prevent full relaxation occurring.

When relaxation is accomplished by a low temperature scouring treatment, the stockings are processed in dye nets in conventional drum and paddle machine They should be loosely packed in the nets so that they are free to move and relax uniformly. For stockings made from conventional crimped yarns, the temperature of the scour bath should not exceed 104°F. (40°C.); furthermore, the degree of mechanical agitation should be slight. These precautions avoid over-consolidation of the stockings. For stockings made from false-twist crimped yarns, the temperature of the scouring liquor should not exceed 140°F. (60°C.). It is advisable to start the scour-relaxation process from cold. After the stockings have been thoroughly wetted out, the bath is heated slowly to the appropriate temperature, over a period of 15 minutes, and maintained for 15 to 20 minutes. In order to avoid possible creasing of the stockings, the liquor should then be cooled gradually by the addition of cold water. The stockings are then rinsed free from detergent using warm and cold water.

Preboarding

To avoid uneven setting which will probably show as patchiness after dyeing, the stockings should be dried before preboarding. Tumble drying should be avoided, otherwise excessive shrinkage—resulting in fabric consolidation—may occur. A brattice or tray drier is satisfactory. The stockings may be preboarded on former shapes current in use for normal nylon stockings; these should prove suitable provided they are not too wide. In addition, the former shape designed for Agilon stockings is equally satisfactory for stockings made from crimped 20 and 30 den. yarns but may be considered too small for heavier deniers. The smallest foot sizes give a good finished appearance, with adequate elasticity. The stockings should be put on the formers with a minimum of tension, and they should be boarded as short as possible, e.g. 20 to 24 ins. in length. The object of preboarding these stockings is to obtain stability and good shape without loss of elasticity.

Good results are usually obtained by preboarding the stockings in steam at 25 lb./sq. in. pressure for 1½ to 3 mins. However, since false-twist crimped yarns can vary according to the source of supply, it is recommended that, for stockings made from these yarns, preliminary trials are carried out in the steam pressure range of 10 to 30 lb./sq. in. Experience will assist the finisher in determining the most suitable preboarding conditions to meet his customer's requirements, and ensure satisfactory counter appeal without loss of elasticity.

Dyeing

Stockings which have been relaxed in steam are scoured after preboarding; stockings which have been scour-relaxed do not normally require an additional scour. Conventional equipment and normal conditions of dyeing with disperse dyes are used, but because of the somewhat heavy construction of crimped stockings, it may be found necessary to increase the agitation, dyeing time or temperature, to ensure dyestuff penetration and levelness of shade. Softening or stiffening agents are applied according to customer requirements. Excessive amounts of stiffening agents impair the handle of the stockings and reduce the elasticity, and the amount applied, therefore, should be small. Softening agents increase the elasticity of the stockings by a lubricating action at the loops.

Final Pressing and Trimming

A flat bed press or standard hosiery finishing machine is all that is required to give the stockings a good finished appearance. During this operation the stockings are placed on formers identical in shape and size to those used during preboarding. It is advisable not to stretch the stockings to a size larger than that used for preboarding. If the stockings are stretched an improved appearance may be obtained but, upon prolonged storage, recovery to their preboarded size will occur.

Post-boarding

Nylon stockings, made from false-twist crimped continuous filament yarn can be finished with certain advantages by a post-boarding technique. By eliminating preboarding, thereby reducing the amount of handling and the number of operations, economies in processing are achieved. However, if the post-boarding sequence of operations is used, great care must be taken at all stages in order to ensure a satisfactory finished stocking.

Temperatures of scouring and dyeing must be kept as low as possible, compatible with obtaining a level and well penetrated dyeing; time of treatment must also be as short as possible. Severe and prolonged dyeing conditions will have a detrimental effect upon the handle and elasticity of the stockings, and excessive creasing will be introduced into the fabric. For post-boarding, it has been found advantageous to relax the stockings in steam at atmospheric pressure rather than by a mild scour, since stockings so relaxed have the better resistance to creasing during scouring and dyeing. In addition, if the normal dyeing conditions do not give satisfactory levelness and penetration, it is recommended that the degree of dye bath agitation is increased, rather than an increase in time or temperature of dyeing. The dyes should be carefully selected to withstand the post-boarding conditions.

It is necessary for the stockings to be uniformly moist or dry before post-boarding. Special precautions must be taken to avoid moisture condensation when post-boarding these stockings. A practical difficulty, not easily overcome, is the phenomenon of "spotting" and patchiness due to localised removal of dye. The bulkiness of these crimped stockings is a contributory factor, but the steam quality and the actual steaming conditions are critical to the success of this method. Radiant heat has proved to be a satisfactory dry setting medium for the post-boarding of the stockings. Because of the greater inherent elasticity of stockings made from conventional crimped yarn, and the attendant danger of over-consolidation during dyeing, post-boarding (i.e., setting the stockings as a final operation) is *not* recommended.

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Society of Dyers and Colourists

Dyeing Polyester Fibres with Disperse Dyes

A RESEARCH project which had as its aim the exact determination of the relationship between fundamental dyeing properties and physical and chemical laws, was related to the West Riding Branch of the Society of Dyers and Colourists recently by Dr. Oskar Glenz (Farbenfabriken Bayer, Germany) when he spoke on investigations of the processes involved in dyeing of polyester fibres with disperse dyes. In polyester dyeing, one of the most important factors, he said, was the rate of the dyeing process, and the rate of dyeing depended primarily on three factors: (*a*) diffusion of the dye on to the surface, (*b*) absorption at the surface of the fibre and (*c*) the diffusion within the fibre.

The diffusion rate, said Dr. Glenz, should be inversely proportional to the particle size of the dye involved; in other words, the rate of diffusion depended on the geometrical relationships between the dye particles and the fibre substance. Moreover, it was certain that the more firmly the dye was attached to the substrate or to certain sites in the substrate, the stronger the energetic correlations between dyestuff and fibre substance.

The same forces which were responsible for the solubility of the dye in the fibre were engaged in such energetic correlations. These may be the attractive forces between permanent and induced dipoles but they could also be Van der Waals or London forces and, finally, there were the forces which originated from the formation of hydrogen bonds. Probably the last of these provided the most energy. When one examined the polyester molecule, it became clear that hydrogen bonds were formed only with dyes which could act as hydrogen donors and were therefore capable of partaking in correlations between the carbonyl groups of the fibre.

In the first place they were interested to know whether there was any grouping in the polyester molecule and for this purpose produced terephthalic acid dibutylic ester as a model substance, and as a result of experimental work, the following interesting finding arose. While the dissolving power of formic acid ethyl ester could be calculated by addition from that of acetone it was not possible to calculate that of acetophenone from benzene and acetone. Acetophenone had considerably better dissolving power than one would expect from a calculation based on acetone and benzene. This must be due to the correlation of the benzene nucleus and the carbonyl function, which caused particularly high polarizability. However, as this configuation was present also in the model ester and in the fibre substance, it might therefore be assumed that the centres which fixed the dye should be looked for in the COC_6H_4CO grouping, on the one hand because of the easy polarizability of this system in the presence of a dipole, and on the other hand because of the ability of this grouping to form bonds with hydrogen donors.

In order to determine the influence of the dye structure on the rate of diffusion, they were compelled to carry out diffusion measurements on a large number of dyes. In order to retain a clear picture, two groups of dyes were considered only for the purpose of the lecture; those whose diffusion was very much retarded by energetic factors, and dyes which took part in only slight energetic correlations. The much retarded dyes included products with hydroxy-groups, which could easily form hydrogen bonds with the carbonyl group of terephthalic ester. These were primarily such hydroxy groups as formed no intermolecular hydrogen bonds and which were sterically capable of reaching the carbonyl group of the ester.

At first they were astounded to find that other dyes with a free hydroxy group were by no means markedly retarded by energetic factors and diffused to an extent which could be deduced almost exclusively from their size, i.e. from geometrical factors. This was the case although the hydroxy group could not be engaged by intramolecular hydrogen bonds. An explanation was that it was not directly possible for a hydroxy group rigidly situated at the end of a straight molecule to approach the carbonyl group close enough to enable hydrogen bonds to be formed.

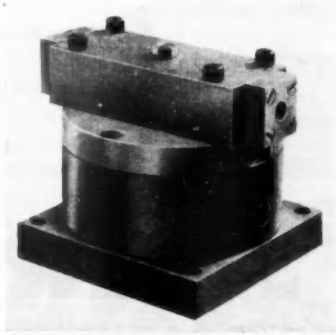
Consideration was then given to those dye molecules which took part in only slight energetic correlations with the fibre and whose rate of diffusion was therefore governed almost entirely by the molecule size. In this connection the most important substances were some of the anthraquinone dyes.

From tests it was observed that the dipole moment of a dye molecule could not be substantially responsible for the fibre/dye attachment forces, because dyes with a similar dipole moment and a not very different constitution, showed a very different diffusion power. "We therefore assume that the diffusion coefficients are influenced not by the dipole moments of the whole molecule but by certain partial moments of molecule parts, which are identical with the total moment only in special cases," said Dr. Glenz. Examples of diffusion retardation caused by dipole force were provided above all, by the anthraquinones containing halogen.

The influence of a carrier was then discussed, and it was felt that the action of the carrier in the fibre depended not upon its nature but upon the number of molecules present in the fibre. Regarding the influence of temperature, Dr. Glenz observed that the activation energy was a measure of the threshold over which the dyestuff must be lifted in order to be able to diffuse. The greater the activation energy the greater the energy required for this purpose, and the greater the dependence of the rate of diffusion on the temperature. Comparison with the activation energy of other dyeing processes showed that of polyester fibre was greater than in the disperse dyeing of perlon and the direct dyeing on cellulose or acid dyeing on wool but it was considerably less than in the basic dyeing of polyacrylonitrile.

When the activation energy constituted a threshold obstructing diffusion, more rapid diffusion could be ensured by providing the necessary energy, i.e. by dyeing at the higher temperature or by reducing the activation energy. They were interested to know whether the latter was perhaps an effect of the carrier, and measurements confirmed this assumption. The addition of a carrier reduced the activation energy so that dyeing would be sufficiently rapid with even a small supply of energy.

New Selector Valve



A NEW ten-port selector valve is a notable addition to the range of pneumatic equipment made by Martonair Ltd., Parkshot, Richmond, Surrey. Briefly, the valve is capable of supplying compressed air from the inlet port to each of ten outlets in turn, exhausting the others. By connecting these outlet ports directly to cylinders direct movement can be obtained. Alternatively, connecting the outlet ports to the pilot ports of relay valves will provide a series of up to ten signals for the sequential operation of cylinders. The use of this valve can lead to great simplification of many circuits—battery mounting ensures rapid removal and interchange of the valve in continuous process work.

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In construction the cord is wound continuously around two pulleys to produce a truly endless belt.

No ply separation
The single layer of load carrying cords round the pulley together, preventing internal stress.

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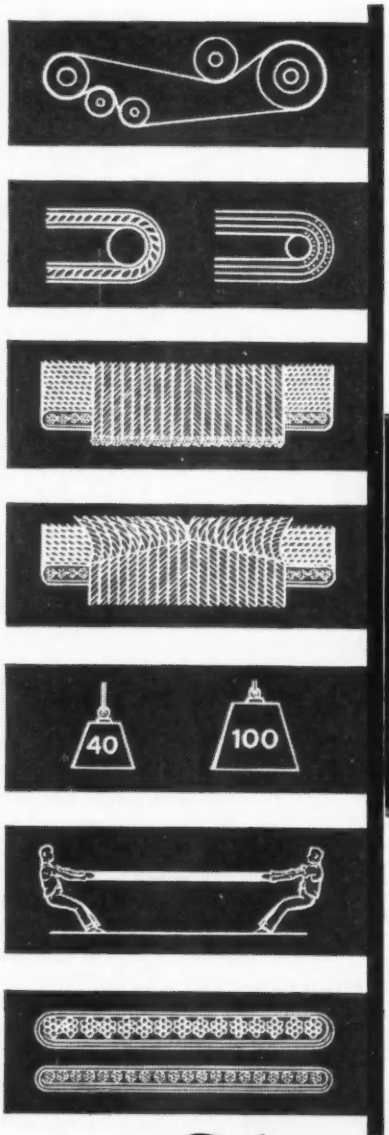
To neutralize lateral movement half the cords are twisted to the right and half to the left.

Elastic envelope
Designed to provide high friction surface to grip the pulley and transfer load to the cords.

Stronger 3T Cord
2½ times stronger than cotton and each filament of fibre is continuous, like the cord itself.

Less stretch
Triple Tempering removes surplus stretch but only to a degree where it does not hinder the flexibility of the fibre.

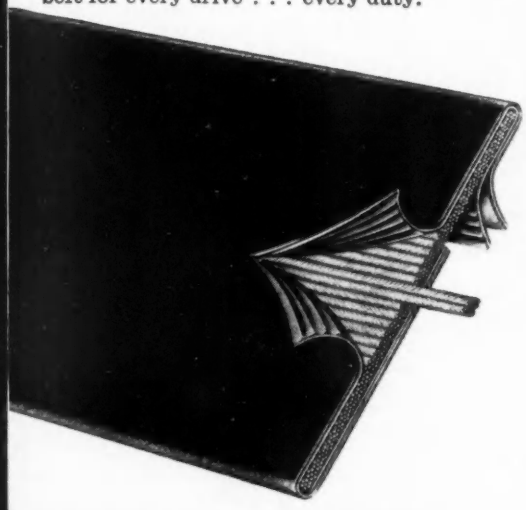
Thinner belt
3-T Cord belt is 25% thinner than belts of equal horse-power rating.



THE amazing new Goodyear 3-T cord process – successfully applied to motor car and commercial vehicle tyres – is also making transmission belts work harder, last longer and cost less for a given horsepower rating.

The synthetic cords are 'triple-tempered' – passed through a process at a controlled Tension and Temperature for a specific Time – to give them maximum strength and flexibility, minimum stretch. The result is that you can use a thinner belt – get improved flex life, longer wear, more efficient transmission and reduced maintenance.

There's a Goodyear 'job-designed' transmission belt for every drive . . . every duty.



NEW HD ENDLESS CORD BELT

The synthetic 3-T cords are *2½ times stronger* than cotton. This means longer service at lower cost on any drive. The special design of the belt eliminates splice failure and ply separation. HD Endless Cord costs no more, yet you get much higher horsepower ratings, better service all round.

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Book Reviews

MANCHESTER ROYAL EXCHANGE DIRECTORY, 1958. Richard Collinson Ltd., 60 Spring Gardens, Manchester 2 (price 42s.).

The 63rd edition of this well printed and handsomely bound official Guide maintains the usual high standard of accuracy in the information it contains. In addition to the alphabetical lists of firms and members of the 'Change, sections are also included listing the classification of trades and the classification by towns of cotton spinners and manufacturers, doublers, bleachers and dyers and finishers. Other details include cotton trade holidays, short history and bye-laws of the Royal Exchange, newspapers, periodicals and directories available, and member's facilities such as private waste sample boxes, cotton reports and private letter boxes.

* * *

VARIABLE SPEED GEARS. Folder GP/8, issued by Carter Gears Ltd., Thornbury Road, Bradford, is the latest addition to the company's range of technical publications on hydraulic infinitely variable speed gears. This folder is a guide to the entire range of both "A" and "F" Type Carter gears and includes dimension and rating tables. Full details of auxiliary equipment (reduction gears, etc.) for use with hydraulic variable speed gears are given in separate publications, copies of which are also available. The folder enables potential users to easily select the type and size of hydraulic variable speed gear best suited to their particular purpose.

* * *

THE 1958 ADVERTISING AND PRESS ANNUAL OF AFRICA. National Publishing Co. (Pty.) Ltd., P.O. Box 335, Cape Town. (African and Colonial Press Agency, 13 New Bridge Street, London, E.C.4) (price 40s.)

Packed into the 400 pages of this excellent guide are an amazing number of facts and figures relating to every facet of advertising and press services on the African continent, all most conveniently arranged and indexed. In addition to lists of advertising agents, newspapers, periodicals and printers, the user is provided with all necessary details of advertising codes and regulations, salient market data in each African territory and notes on organisations serving African advertising and publicity. Aerial, bus, cinema, mail, poster and radio advertising are all thoroughly covered.

S.P.S.

* * *

CUTTING COSTS FOR PRODUCTIVITY. British Productivity Council, 21 Tothill Street, London, S.W.1 (price 5s.).

This pamphlet contains edited versions of 14 papers read at the five sessions of the B.P.C. conference held in conjunction with the Factory Equipment Exhibition last April. The speakers, representative of British industrial management and labour, took as their subjects various aspects of costing, variety reduction and quality control, shift work, and the team approach. Special emphasis was laid on the interests of small and medium-sized firms.

THE PHYSICAL PROPERTIES OF COTTON. By Dr. A. N. Gulati, M.Sc., F.T.I. Asia Publishing House, Bombay. 1957. pp. 192 (price 16s.).

The book deals with the development, structure, composition and physical properties of cotton fibre and yarn. Among the physical properties explained are fibre-lengths, fibre-fineness, fibre-maturity, strength and elasticity, and related subjects. A wide variety of testing apparatus and methods employed in the determination and testing of the properties is explained. There is also a valuable chapter on some of the statistical methods often used in interpreting the physical properties of cotton. All the known methods for testing fibre and yarn properties are reviewed, accompanied with the appropriate literature references at the end of each chapter. The author's book is a comprehensive compilation of the work done and published during the last thirty years. It is well written and produced, and includes a number of excellent plates, diagrams and tables within the text. It will undoubtedly, be useful to students and the many technicians in cotton mills and testing laboratories handling fibres, yarns and fabrics.

B.S.

* * *

BRITISH AND DOMINION TEXTILE INDUSTRY. John Worrall Ltd., Oldham. (price 30s.).

This publication has behind it the publishers' long experience in compilation, and consequently its reliability and comprehensiveness may be taken for granted. As pointed out in the preface, its territorial coverage accounts for its major preoccupation with the hosiery and knitgoods industries. The method of arrangement is that standard in the "Worall" series, whereby the user can trace firms by location or by product. The directory includes coverage of Australia, Tasmania, Canada, New Zealand, South Africa, Rhodesia and Nyasaland, and Northern Nigeria in addition to the U.K. and Ireland. Buying, statistical and commercial sections offer much information.

S.P.S.

* * *

INDEX OF QUALITY NAMES. Federation of British Carpet Manufacturers, 55-61 Moorgate, London, E.C.2 (price 3s.).

This extremely handy little publication is really comprehensive in character. It gives in alphabetical order the names of a wide range of British carpets and the firms making them. In future editions it would be a good thing to also give the addresses of firms.

* * *

WHAT MAKES WOMEN BUY? By Janet L. Wolff. McGraw-Hill Publishing Co. Ltd., 95 Farringdon Street, London, E.C.4 (price 46s. 6d.).

"We may safely assert that the knowledge which men acquire of women is wretchedly imperfect and superficial." These words of John Stuart Mill have been proved true over the years yet, although most purchases of consumer goods have been made by or influenced by women, men have written the bulk of the literature of salesmanship. Mrs. Wolff's book is therefore warmly to be welcomed, as it embraces all fields which sell or advertise to women. In twelve chapters, this eminent copywriter provides the key to better sales to women, analysing why women, because of physical and mental characteristics, feel, think and buy the way they do, how their interests affect sales and how they may be influenced. The emphasis is, of course, on the American way of life, but changes in present-day living standards make the book's conclusions and recommendations applicable to most civilized countries. At the end of each chapter, "Feminine Guide posts" put the information into easily assimilable form.

Mrs. Wolff's work incorporates the results of many investigations into the feminine market and furnishes very practical guidance on understanding and influencing the modern woman.

S.P.S.

* * *

DEN TEXTILA KONSUMTIONEN. By J. Ekström. Industrial Institute for Economic and Social Research, Stockholm 16, Sweden (price 12 kr.).

For the convenience of British readers this report on the consumption of textiles contains a 12-page summary in English. In addition, the headings of statistical tables are repeated in English, so that the language barrier to appreciation is at least partly overcome. The investigation has been chiefly concerned with the Swedish market and with what the author speaks of as the third stage in the textile industrial revolution, a phase which began when purchasing power so increased that clothing quality and design became more important than price. Twenty-eight tables and numerous diagrams give statistical support to the text and render easy comparison of Swedish data with those of Great Britain, the U.S.A. and the principal European countries. There is also a short bibliography, international in coverage. This survey of Europe's most Americanised market offers much valuable information to those exploring marketing possibilities or wishing to consolidate existing trade relations.

S.P.S.

Textile Institute News

Mr. A. F. W. Coulson, B.Sc., F.T.I. (director, R. Greg & Co. Ltd., Reddish, Stockport), has been elected as hon. treasurer of the Institute in succession to Mr. R. J. Smith, F.T.I., who has retired after 12 years' service as hon. treasurer. Many tributes were paid to Mr. Smith by council members for his long work as hon. treasurer, and in recognition of his invaluable services he has been elected an honorary life member of the Institute.

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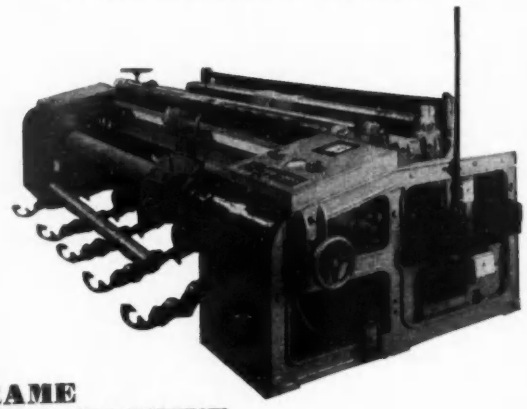

Tube frame threaded with the spool in its spring holders; eliminates four operations (patents pending). Needles are brought forward by simple foot operated switch, leaving operatives' hands free to attend to interrupted ends and return to thread by the same operation. Tube frames can be threaded as fast as removed from the chain, thus facilitating immediate return to their last position in the chain. All needles have rounded crochet hook ends, preventing yarn damage and enabling smoother threading. All spool end strive difficulties overcome enabling, 100% threading even if strive is as much as 1" by our new full length comb. By fitting side supports the standard 4/4 machine can thread 2/4 to 16/4 Tube frames, or a machine can be supplied 12/4 in width. Tube Frame automatically clamped eliminating still a further hand operation.

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Export Opportunities

Western Germany :
Tartan Furnishing Fabrics

Hans A. Rotter, Berlin-Wilmersdorf, Jenaer St. 15, would welcome quotations from U.K. suppliers for tartan furnishing fabrics in wool. He is sole owner of the concern which is engaged in the import and wholesale of furniture and furnishing fabrics, acting on behalf of several foreign firms, including a U.K. concern. Suppliers interested should write direct, also notify the British Consulate-General, Charlottenburg 2, Uhlandstrasse 7-8, Berlin.

Western Germany:
Worsted Suiting

Angenete and Scholle, Herford, Wittekindstrasse 2, want to contact U.K. suppliers of men's worsted suiting. Established in 1886, they manufacture suits, coats, sports jackets, dressing gowns, etc., and employ 350 persons. Suppliers interested should write direct, also notify the British Consulate-General, Duesseldorf, Cecilien Allee 16.

Western Germany:
Velvet Piece Goods

Gesellschaft fuer Velvet Industrie m.b.H., Krefeld, Jägerstrasse 19, want to contact U.K. suppliers of velvet piece-goods 50 - 51 ins. wide.

The material should be approximately similar to a sample which is available for inspection in Room 620 at this Branch until July 16, after which date it will be available for loan in order of receipt of applications.

Established in 1925, they are converters engaged in the production of piece goods most of which is manufactured by other firms under contract. Manufacturers interested should write direct, also notify the British Consulate-General, Commercial Section, Duesseldorf, Cecilienallee 16.

Australia:
Cotton Hair Cords, etc.

A. H. Carr and Co., 424 George Street, Sydney, would like to represent a U.K. mill able to offer printed cotton hair cords, sateens and cretonnes, also a manufacturer of elastics and elasticized materials. Established in Sydney for over twenty years, the firm have modern office accommodation and showroom facilities. Operating on a commission basis they mainly cover New South Wales but offer all Australian coverage. Suppliers interested should write direct, also notify the U.K. Trade Commissioner, Prudential Building, 39-49 Martin Place, Sydney.

U.S.A. :
Sheets, Pillowcases, etc.

The Acala Fabrics Company, 749 Flood Building, 870 Market Street, San Francisco 2, California, would like quotations for cotton and linen bedsheets (78 × 108 ins. to 81 × 108 ins.); cotton and linen pillowcases (American-style, open ends); terry towels (hand and bath) and huckaback face towels. Formed in 1956, they supply bedlinen and towels to hotels, motels, hospitals and operators of service flats. Manufacturers interested should write direct with quotations showing f.o.b. and c.i.f. prices in U.S. currency, also copy correspondence to the British Consulate-General, 2516 Pacific Avenue, San Francisco 15, California.

Vietnam :
Piece Goods and Suitings

Mr. C. R. Schaeffer, 14 Rue Chaigneau, Saigon, is interested in U.K. agencies for piece goods (man-made fibres) and lightweight suitings. He is the owner of a commission agency business and is reported to be one of Vietnam's outstandingly successful businessmen. Suppliers interested should write direct, also notify the Commercial Department, British Embassy, Hongkong and Shanghai Banking Corporation Building, 1 rue Georges Guynemer, Saigon.

Pakistan:
Textile Accessories

United Textile Mills, Multan, are interested in receiving quotations for the following spares and accessories, the mill being in possession of a licence to import these:—

(1) Ring travellers.
(2) Metallic card clothing.
(3) Steel spinning rings.
(4) Green clearer cloth 54 ins. wide, weight 20 ozs.

Suppliers interested should write direct also notify the U.K. Trade Commissioner, P.O. Box No. 287, National House, Bank Square, The Mall, Lahore.

Western Germany:
Ropes, Yarns, etc.

C. G. Ahlers, Bremerhaven-W, Weserstr 159, are interested in importing:—

(1) Ropes of *plaited* nylon fibres.
(2) Ropes of twisted thick nylon.
(3) Nylon net yarns, plaited and twisted, for the fishing industry.
(4) Nylon washing lines, having *no metal* parts or fastenings of any kind and attractively packed in individual transparent plastics containers.
(5) Hemp ropes, mainly those of a breaking strain of 75 kilos and also of 95 kilos per sq. mm.

The firm request details of prices, weights and measurements (metric).

Established in 1868, they are hemp and wire rope manufacturers and firms interested should write direct also notify the British Embassy, Commercial Department, 77 Friedrich-Ebert Allee, Bonn (22c).

Canada:
Hydraulic and Electrical Equipment

The United Kingdom Trade Commissioner at Toronto has been approached by Lucas-Rotax Ltd., who wish to contact U.K. companies with a view to obtaining manufacturing rights in the hydraulic and electrical fields, particularly in those cases where precision is an essential part of the operation. Formed in 1949 they are the subsidiary of Joseph Lucas (Industries) Ltd., Birmingham. They provide a completely integrated engineering service for design, development, manufacture and repair and overhaul of electrical, hydraulic, pneumatic and combustion equipment. Also provided are overhaul and repair services right across Canada based on two modern plants in Montreal and Vancouver. Firms interested should write to Mr. I. J. Hulbert, Lucas-Rotax Ltd., P.O. Box 115, Station H, Toronto 13, also notify the U.K. Trade Commissioner, 119 Adelaide Street West, Toronto.

Western Germany:
Twill Printed Material

Fritz M. Tübke, Berlin SW 68, Lindenstrasse 44, would like to contact U.K. firms able to supply twill printed material for making-up into ties, scarves, etc. Established in 1909, as manufacturers of ties and scarves, they employ 185 people and manufacturers interested should write direct, also notify the British Consulate-General, Commercial Section, Charlottenburg 2, Uhlandstrasse 7-8.

Iran:
Textiles, etc.

Mr. S. Fatoullazadeh, 14 Seraye Tchitsaz, Tehran, a commission agent, wholesaler, importer and exporter is interested in agencies for the whole of Iran from U.K. firms for textiles (all kinds); detergents and soap; fibre boards and glass fibre sheets. Manufacturers interested should write c/o Export Services Branch, Board of Trade, Lacon House, Theobalds Road, London, W.C.1.

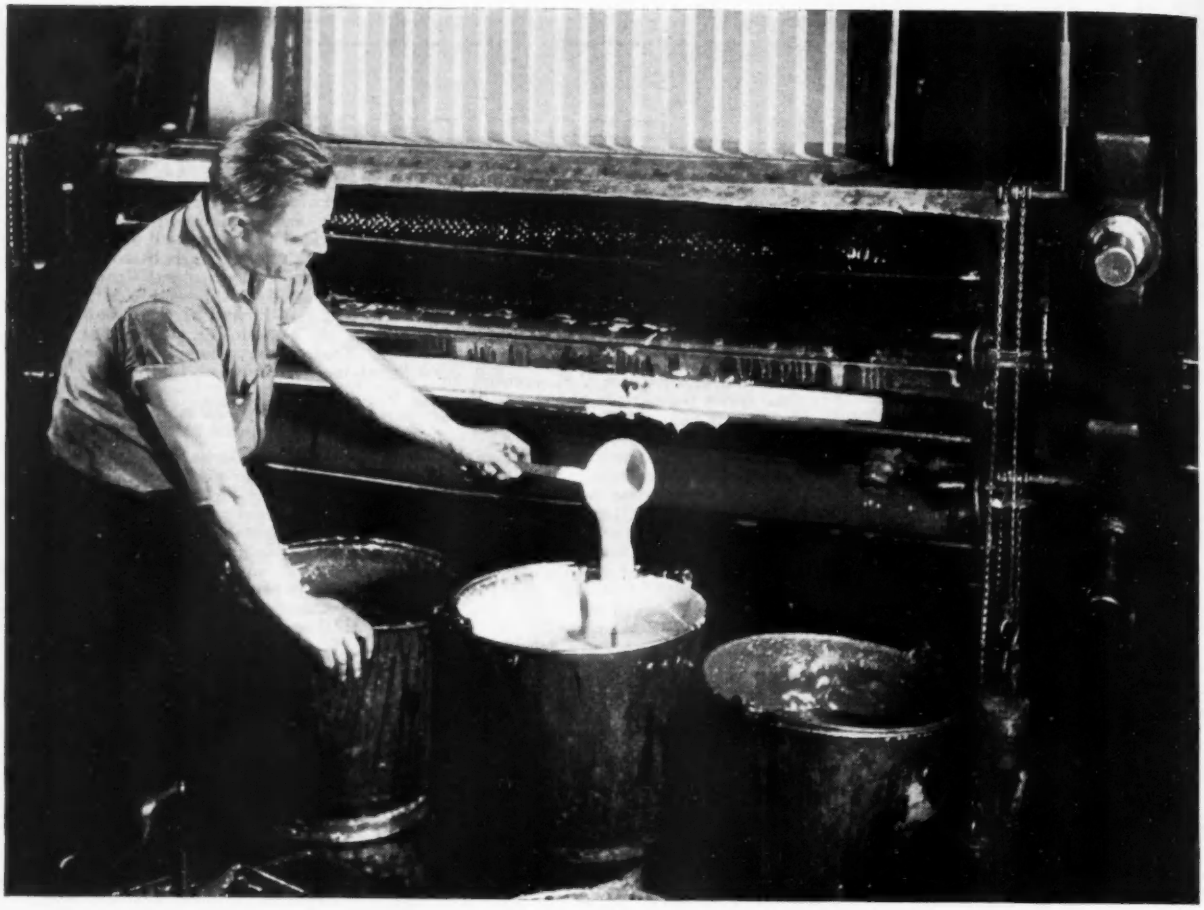
Canada:
Felt

E. F. Walter Ltd., 8225 Labarre Street, Montreal, is seeking U.K. supplies of underlay of 5 mm. thickness of latex foam bonded on a hessian base. In addition he wants to contact a manufacturer of woven felts and will purchase such material in the piece from which the small components used in the manufacture of pianos will be produced by his firm. Established in 1893, they have branches in Toronto and Vancouver and can provide coverage right across Canada. Firms interested should write direct, providing samples, f.o.b. and c.i.f. prices in Canadian dollars, and notify the U.K. Trade Commissioner, 1111 Beaver Hall Hill, Montreal.

South Africa:
Worsted Yarns, etc.

Lindex South Africa (Pty.) Ltd., P.O. Box 4536, Johannesburg, would like U.K. agencies for fine quality worsted yarns, cotton yarns and fine single or double wool combs.

Lindex South Africa (Pty.) Ltd., were Founded in 1946, hold a wide range of textile agencies, principally in cottons and rayons, for mainly U.K. and U.S. principals and employ fifteen travellers. Suppliers interested should write direct, also notify the U.K. Trade Commissioner, P.O. Box 10101, Pritchard House, Pritchard Street (cor. Von Weilligh Street), Johannesburg.



How to set the pace in fastness

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Textile Trade and Prospects

Cotton Yarn and Cloth Markets

There is little at the moment to cheer traders in Lancashire. The closing of mills and extension of short time working has almost become weekly repetition with apparently little effort being made by the government to improve this disastrous state of affairs. The machine capacity and operative potential has now reached such a low state that it could never meet any sudden demand for substantially higher output should the occasion ever arise. Joint action by every section of the industry is imperative for it must always be remembered that no one can stand out and hope to weather this storm alone. Less cloth means less yarn and less finishing, etc., and skilled operatives in all three are being lost at an alarming rate with insufficient juveniles entering to balance the labour situation. Appeals to the public not to buy foreign cloth can have little effect because so many fail to see any difference; their main concern is the price without caring too much about quality or where the product comes from.

In trading circles a few of the more optimistic type incline to the view that the trade has touched the limit of the recession and should now show some early signs of improving. In general, inquiry for yarns has covered almost every count and quality but the total of firm orders remains disappointingly low. Most of business put through has been for standard weaving qualitites on ring beam, cop, cone and cheese. Medium counts have been in modest request with, perhaps, a little more support accorded one or two qualities of doubling wefts. Some slight improvement has been observed in condenser types, some counts of hosiery yarns and the specialities and blended types. Apart from this, the off-take remains poor and few firms can afford to run to stock at prevailing prices.

On the manufacturing side orders remain particularly difficult to obtain. Present inquiry remains poor and orders given out are done so sparingly to replace immediate needs. Dress goods are only moving slowly in most qualities whether colour woven or printed. New designs and fresh, bright colours have, in one or two instances, brought in orders but in no case have the yardages been substantial. In furnishing fabrics more interest would seem to have been placed in contemporary designs than traditional types. Medium priced cloths have found some buyers and duplex printed varieties have been in reasonable demand. Household textiles are having a little better time. Cotton blankets in plain and checked design are moving more freely and sheets, etc., are in better request. Towellings of all kinds are about the same in off-take and much more volume could be accommodated in all ranges of hand and bath varieties. Roller qualities are rather poorly supported. A few Commonwealth and Continental markets have been a little more active.

New Season's Wool Sales

The first sales of the Commonwealth wool marketing season for 1958-59 opened in Australia in the third week in August with simultaneous auctions in Brisbane, Melbourne and Perth. During the first week of the season nearly 150,000 bales were offered, followed in the second week by offerings totalling more than 100,000 bales at Sydney and Adelaide. The South African season opened in the week commencing September 1, with sales in Cape Town, Port Elizabeth, East London and Durban, but the New Zealand season does not open until late October. Official indications (writes an I.W.S. correspondent) are that Australia will market a somewhat smaller clip in the coming season. Receipts into brokers' stores are expected to be 4,240,500 bales, approximately 112,000 bales fewer than actual receipts during the 1957-58 season lately concluded. In net weight, the coming clip is estimated at 1,386 million lbs. (greasy), as compared with 1,428 million lbs. last season—a decline of about 3%. The fall is attributed to drought during the early part of the growing season—which is said to have been one of the most difficult of recent years for producers—but pastoral conditions recovered during later months.

Drought is also reported to have adversely affected the forthcoming South African clip, but the effect of this on production is not yet known. On the other hand, New Zealand conditions have been more favourable, and the New Zealand Department of Agriculture forecasts an increase of between 15 and 20 million lbs. in the 1958-59 clip, to a total exceeding 400 million lbs. The Commonwealth Economic Committee in London states that, while it is still too early for any detailed appraisal of world wool supply prospects for the coming season, it is already clear that, for the second year in succession, world production will be lower than in the preceding season. The Committee believes that "a drop of about 2% in world output may well occur in 1958-59, following the 3% reduction which took place in the season just ended."

So far as the outlook for demand is concerned, official figures show that wool consumption in most of the chief manufacturing countries has been at a somewhat lower level during the greater part of the last year, largely due to a tendency to work down stocks of materials and manufactured goods which had accumulated at various stages of production. The rate of decline in wool consumption has slowed down considerably in recent months, however, and with generally lower stocks at intermediate stages of manufacture, the outlook for the new wool marketing season is considered to be correspondingly more healthy.

The Commonwealth Department of Statistics announces that a revised estimate of the 1957-58 Australian wool clip is 1,426 million lbs. (greasy), or 2 million lbs. less than a preliminary estimate. This compares with the all-time record of 1,564 million lbs. set up in 1956-57. A first estimate of the 1958-59 clip, the marketing of which will commence later this month, is 1,386 million lbs. (greasy), or about 3% below the estimate for the season lately concluded. The Commonwealth statistician also estimates that Australia's flock of sheep and lambs at March last numbered 149,250,000, a decline of 600,000 on the previous year, and the first decline in 10 years.

The rate of wool consumption and top production in the U.K. during June was slightly higher than in May, though still considerably below the high levels ruling a year ago, states the Wool Industry Bureau of Statistics. In wool, the rate of consumption was 2% higher than in May, but 16% below a year ago. Consumption on topmaking account was 15% below June last year, and for woollen trade purposes 18% down. The worsted yarn delivery rate in June was 1% below that of May, and showed a decline of almost 20% on June, 1957. A modest woollen trade recovery is indicated by the fact that, in woven wool fabrics, the delivery rate in June was 8% higher than in May, though worsteds were 4% lower. Total deliveries were 3% higher than in May though, compared with a year ago, they were nearly 21% lower.

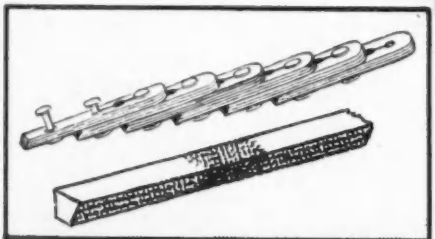
Linen Trade Review

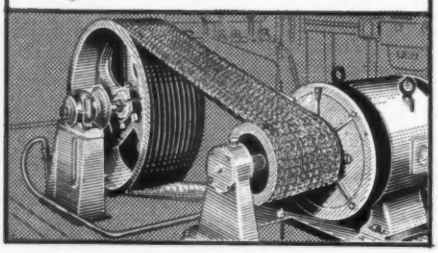
The process of amputation proceeds concurrently with the contraction in trade. While there has been a substantial decline in productive capacity in all sections of the industry the current level is still above anticipated future demand. The suggestion which has been made that the large vertically integrated concerns and groups should more or less determine policy and price has had, naturally, a cool reception from the smaller individual units which, in many instances, can operate more economically than their larger sized competitors.

The merits of size and structure must, in the last resort, be measured by ability to find an outlet for the end products on a competitive basis. Increasing competition of man made fibre textiles, and their adaptability to many end uses formerly reserved for specific natural fibre materials, gives manufacturers of the latter less freedom to determine the range and nature of their output, so that long term planning is more difficult. This need for flexibility can generally be met better by the smaller individual units where decisions can be taken and made effective more quickly.

There has been a marked improvement in inquiries in recent weeks and some useful business has been transacted. As stocks generally are fairly low, mills and

the end to endless trouble





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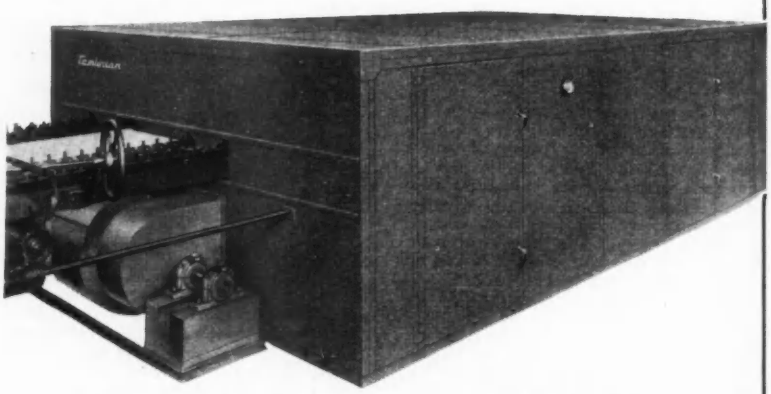

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factories have increased their coverage for spindles and looms now working to the extent that further commitments would require bringing idle machinery back into production. Orders booked cover a wide range of household and dress goods. Buyers are interested in quality and novelty fabrics in pure linen and in linen/man-made fibre mixtures. In the first mentioned class production has been defined by the problem of obtaining flax of suitable quality. The progressive decline in this in post-war years is causing increasing concern to spinners who have, so far, been unable to offset this completely by improved processing techniques. Certain progress has been achieved in the production of linen/man-made fibre blends, and the results warrant a more thorough investigation, particularly with the object of utilising equipment now idle.

Crop statistics published by the N. Ireland Ministry of Agriculture record "a phenomenal decline of 70% in the area under flax" in the present year, to an all time of less than 1,000 acres. Having spent approximately £350,000 in the 20 years since its inception with the charge to investigate "To what extent flax capable of competing in quality, handling and price with supplies coming from elsewhere can be remuneratively produced in this country," during which time the area under flax has declined—with fluctuations—from 20,500 acres in 1938, the Flax Development Committee seems to be concentrating its activities on interesting the farmer in flax as a crop, instead of interesting the spinner in creating a demand for home-grown fibre.

Experiments are continuing on the development and testing of new fibre flax strains to improve yield and quality. The results of recent work in this connection are summarised in a publication, "Flax Variety Trials," which has been issued by the N. Ireland Ministry of Agriculture, and from which the following results are summarised. The values given for all varieties represent the mean of tests carried out at six different centres during the years 1954-56 inclusive. The first two varieties are of Dutch origin. Noblesse is a blue flowering variety, and Wiera a white blossom variety, though both have the same parentage.

Variety	Yield of Scutched flax per acre	Percentage Scutched flax Retted flax	Value of Scutched flax per stone
	st. lb.	%	s. d.
Noblesse ..	43 8	16 0	35 4
Wiera	41 8	14 9	36 0
Stormont Gossamer ..	36 13	14 9	36 6
Liral Prince ..	36 0	14 6	36 1
Percello	33 8	14 5	36 0

There is little activity in the raw material market. Most available labour is still diverted to field work, and with processors holding back in anticipation of a rise, scutching is almost at a standstill. Harvesting of the current crop has been delayed by unfavourable weather and some damage to the straw is reported. Man-made fibre statistics published by the Board of Trade show a further decline in deliveries to the flax spinning industry, being 4,065,000 lbs. for the April/June period of 1958, compared with 4,126,000 lbs. for the corresponding period of 1957.

Jute Fibre, Yarn and Fabrics

During July raw jute markets were firm in Pakistan and prices tending to become dearer especially in the near shipment position. Offers of the fibre were not being freely made and there were prospects that the crop would be later than usual in being harvested. However, the position has now changed and arrivals of loose jute from up-country in East Pakistan have increased considerably with shippers offering freely; quality is also much better. At present everything points to a satisfactory crop for the coming season and provided no political upsets occur, prices should not rise much beyond present levels. U.K. spinners were moderately interested in raw material supplies during the first half of July. The main demand was for early shipment fibre as stocks held by spinners were low. Registered sales to the U.K. during July were over 113,000 bales which is above the average of the two previous seasons for the same month. Much of this additional buying was due to the Middle East crises but the position now is quieter. Most grades of fibre are available at the ruling E.P.C. levels with Mill Firsts at £112, Mill Lightnings at £97, Mill Hearts at £87 and grade Hearts at £69 : 10s., c.i.f. U.K. Aug./Sept. shipment. Although one or two sellers are offering a discount for forward shipment this is by no means a general rule and at present a steady price is being quoted up to the end of November. New crop dark jute is now being offered with grade Tossa-2/3 at £111 and grade Tossa-4 at £101. Continental Tossa-2/3 is at £95 : 10s. and Continental Tossa-4 at £85. Crack Daisee-2/3 is available at £101 and grade Daisee-2/3 at £95, c.i.f. U.K., Sept./Oct.

The Calcutta goods market became much firmer during the first half of July due to the trouble in the Middle East. In fact prices of hessians and sackings advanced much more than was the case of raw jute. Although prices eventually declined they did not return to their former level. Stocks of goods held by the Indian mills at the end of July showed a large drop in the case of hessians. This amounted to 11,100 tons which is the biggest for a very long time. Stocks of sackings were greater by 2,000 tons at the end of July compared with the end of the previous month. These alterations in stocks were generally expected and had little influence on prices. The only noticeable feature being a fairly wide difference between hessian prices for current and forward shipment. A considerable premium was being asked in the near position. U.K. buyers showed interest but due to the differences in prices confined purchasing to the September shipment position. Quotations are at 63s. 7d. for 10 ozs. 40 ins., and 48s. for 7½ ozs. with 11 ozs. 45 ins. at 70s. 2d. per 100 yds. f.o.b. Calcutta for September shipment; B twills were quoted at 151s. 4d. September.

Demand for yarns and cloth in Dundee has been confined to small quantities and there has been a good deal of short time working. However, the trouble in the Middle East during July brought out a much improved demand and mills and factories booked orders for delivery several weeks ahead. This was a welcome relief and most establishments were able to revert to full-time working after the holiday period. However, demand has again fallen away but although the position is quieter producers remain busy with previous orders. This increased business in the first half of July was spread over most descriptions of yarns and cloth and the heavy end of the trade in particular benefited from the improvement.

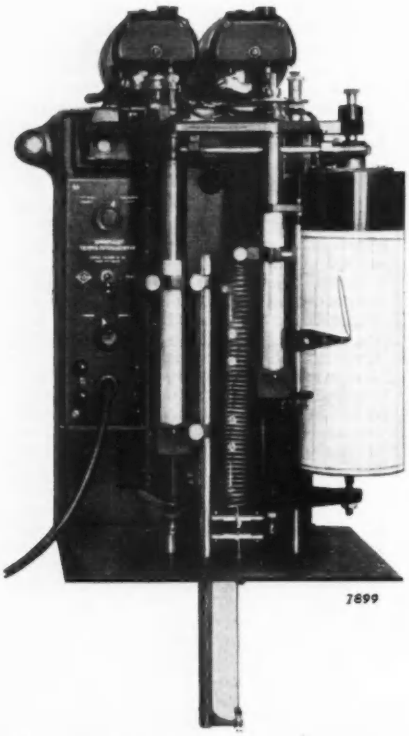
Man-Made Fibres and Fabrics

Activity has been somewhat quiet during the past few weeks, and demand for most types of yarns reflect the generally unsettled conditions in the industry at present. The position in so far as the rayons are concerned is one of falling demand, with staple being maintained fairly well, but the call for most classes of filament yarn tends to fall rather sharply. Again, the new synthetic fibres have not shown any pronounced advance in recent weeks, although it is possible that autumn may see some further gains by the newer fibres at the expense of the older man-made fibres. The position in so far as the acrylics is concerned is that the established yarns, together with the later-introduced-acrylics are tending to suffer from the general state of trade of the industry, but the position may be expected to improve when advance buying begins to get under way again.

In the Lancashire trade, there is again a strong call for blends of "Terylene" and cotton, with nylon and cotton also in request. The demand for blends of viscose rayon and cotton seems to have decreased in recent weeks again. Some interesting novelty fabrics are being introduced despite the poor overall state of trade, by one or two concerns in the speciality markets. Furnishings, within a specialised field, are selling reasonably well, but the demand for dress fabrics, especially all-rayon, is nothing exciting at present. For the Yorkshire trade, the position is one of emphasis on woollens for men's and ladies' apparel. Furnishing fabrics, including wool and "Fibro" continue to enjoy a reasonable measure of demand. The call for blended suitings is reported to have fallen away in recent months, and the outlook for the West Riding is by no means as bright as even six months ago, due in the main to the threat of imported goods. This is reacting against the industry in part something like that suffered by Lancashire, but the emphasis is by no means so strong. Nevertheless, full employment no longer persists in the trade.

At the commencement of the Leek holidays, trade conditions remained similar to those prevailing the previous month. The knitwear section is now receiving orders for September and on a slightly better scale than earlier this year. Manufacturers are hopeful that trade will pick up from September onwards. In braids, business remains patchy with not much prospect of an increased tempo of activity. Cottons and sewing threads are reported to be "a little improved."

Taking the position all round in the Staffordshire area, it is slightly improved as compared with recent months but not as good as this time last year. The slightly increased activity at present, nevertheless gives promise of better things, but hopes at the present time are "cautious." The Macclesfield area is also finding trade conditions none too good. Demand for most types of screen printed styles is only slow, including handkerchiefs and tie fabrics. Machine printers are also finding things quiet.



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Notes and News

Fastness to Daylight of Coloured Textiles

An amendment to the British Standard (B.S. 1006 : 1958) for the determination of fastness to daylight of coloured textiles has been issued to regularise the use of fading lamps within the terms of the specification. The document is Amendment No. 1 (PD 3078) to B.S. 1006. The British Standard test calls for the exposure of specimens to natural daylight only—this because authoritative opinion has long maintained that artificial light sources are not a true alternative and that results obtained by them should be regarded merely as approximations. An appendix in the amendment explains the reason for this view and refers to recommended conditions for the use of fading lamps; the recommendations have been evolved by the Society of Dyers and Colourists. The amendment also revises parts of the standard dealing with the dyed reference patterns, arrangement of specimens, and method of assessment. These changes are intended to bring B.S. 1006 into agreement with the test procedure developed through the medium of the I.O.S. Copies may be obtained from the British Standards Institution, 2 Park Street, London, W.1.

Perkin Centenary Trust Awards

The Perkin Centenary Fellowship, awarded to Mr. D. Balmforth of Courtaulds Ltd., Coventry, is tenable in the Department of Colour Chemistry at the University of Leeds. Centenary scholarships have also been awarded to Mr. B. Higginbottom of Bolton (Bleachers Association), tenable at the College of Technology, Loughborough, and to Mr. W. K. McCourt of Belfast (Courtaulds Ltd.), tenable at Queen's University, Belfast. Arrangements have also been made for a Perkin exchange lectureship whereby short visits will be exchanged between Prof. A. J. Birch, F.R.S., of Manchester University, and Prof. V. Prelog, of Eidgenössische Technische Hochschule, Zürich. Prof. Birch will visit Zürich in September, 1958, and it is hoped that Prof. Prelog will return the visit the following year. Each will deliver one or more lectures during the visit.

Card Dust Extraction

Textile Machinery Makers Ltd. (selling through Platt Bros. (Sales) Ltd., Oldham) and Tweedales and Smalley Ltd., Castleton, are now authorised suppliers of the "Shirley" pressure point system for card dust extraction. The following firms are now authorised to install the system under licence from Shirley Developments Ltd.:—

Hamilton (Rochdale) Ltd., Cheetham Street, Rochdale.
James Howorth and Co. Ltd., Victoria Works, Farnworth.
Mellor Bromley (Air Conditioning) Ltd., Barkby Road, Leicester.
Platt Bros. (Sales) Ltd., Oldham.
"Textile" Air Systems Ltd., Unsworth Street, Radcliffe, near Manchester.
Tweedales and Smalley Ltd., Castleton, Rochdale.

Lower Prices for Lurex Yarns

Dobeckmun (Britain) Ltd. announce the dropping of the surcharge for colours in both Lurex MM (metallised Mylar) and Lurex MF (Mylar foil) yarns. This means that the previous surcharge of 6s. 0d. per lb. on the MM colours (scarlet, emerald green, royal blue, bronze, black and multicolours 4A4 and 6A2) will now be removed —as will the surcharge of 5s. 0d. per lb. on the MF colours (scarlet, emerald green, royal blue and bronze). All coloured Lurex Mylar yarns will now be sold at the same price as the gold and silver yarns. This surcharge removal coincides with the news that Dobeckmun is now in a position to supply both MM and MF yarns in the full shade ranges in *all three main widths*——1/32, 1/64 and 1/100 in.

Anti-Static Agent in Dry Cleaning

Fabrics, etc. are rendered anti-static during dry cleaning by treating them with a clear readily-filtrable solution containing both a dry-cleaning detergent, e.g. a nonylphenol condensed with five molecular proportions of ethylene oxide, and an anti-static agent which is either soluble in the dry-cleaning solution in effective concentrations (e.g. ethylene glycol monoricinoleate) or can be solubilised in it by the detergent or by a co-solvent (e.g. glycercol monoricinoleate) and then centrifuging and drying. (Can. Patent 548,324.)

Protection of Textile Against Dirt

Textiles are rendered dirt-resistant by applying to them partially neutralised stearic acid preferably containing a humectant such as glycerol. The product is preferably applied before ironing so that the iron can melt the material, which will form a film round the fibres. (Brit. Pat. 788,020.)

Change of Name

Alar Ltd. has formed a combined organisation with the Federation of Light Metal Smelters. The name of the new body is the Association of Light Alloy Refiners and Smelters, 3 Albemarle Street, London, W.1, and the following is the list of members: Associated Lead Manufacturers Ltd.; Atkins 'Metals' Ltd.; B.K.L. Alloys Ltd.; John Cox and Sons (Metals) Ltd.; John Dale Ltd.; Enfield Rolling Mills (Aluminium) Ltd.; Eyre Smelting Co. Ltd.; J. Frankel (Aluminium) Ltd.; International Alloys Ltd.; John E. Moore Ltd.; Norton Aluminium Products Ltd.; T. J. Priestman Ltd.; Wigley Aluminium Ltd.; Wolverhampton Metal Co. Ltd.

B.C.I.R.A. Council Changes

Two changes are announced in the composition of Council of Shirley Institute. Mr. C. E. Harrison, chairman and managing director, English Sewing Cotton Co. Ltd., has been co-opted a member of Council, also Mr. J. Milhench, the new secretary of the United Textile Factory Workers' Association.

Lecture to U.S. Army

Mr. L. H. C. Tippett, assistant director (British Cotton Industry Research Association), has been invited by the Office of Ordnance Research, U.S. Army, Durham, North Carolina, to address the fourth conference on the "Design of Experiments in Army Research Development and Testing," to be held at Natick, Massachusetts, October 22-24, 1958. He will present a paper entitled "Statistical Methods Applied to the Textile Industry." It is worth noting that many statistical methods now used by research teams of other industries were pioneered at Shirley Institute.

Plan for Cotton

The Rt. Hon. Harold Wilson, M.P., is to talk about his "Plan for Cotton" to members of the Manchester and District Section of the Textile Institute on November 28. The meeting will be at the College of Science and Technology. The Section is also to hold special discussion meetings at the Midland Hotel on October 16 and 22, when the subjects will be, "Problems Associated with High Speed Weaving" and "Discussion on Productivity of Modern Cotton Spinning Equipment."

"Courlose"

Courtaulds Ltd. have appointed J. M. Steel and Co. Ltd., Kern House, 36/38 Kingsway, London, W.C.2, as U.K. distributors of certain grades of "Courlose," which is the registered trade mark applied to all grades of sodium carboxymethyl cellulose manufactured by Courtaulds. The various grades are used for thickening, stabilising dispersions, sizing and coating in the textile and other industries. The principal varieties are distinguished by key letters as follows:—

PURE GRADES
"Courlose" F Salt-free
"Courlose" P Pharmaceutical
TECHNICAL GRADES
"Courlose" A Alkaline
"Courlose" N Neutralised

J. M. Steel and Co. Ltd. will distribute the F and P grades and continue to distribute the "Celacol" brands of methyl and hydroxyethyl methyl cellulose manufactured by British Celanese Ltd. Technical service for all three will be provided by the Chemical Sales Dept. of British Celanese Ltd., London, and Coventry.

Bundesmann-Type Apparatus

Work carried out in the U.K. with the Bundesmann machine has produced evidence of unidentified variables, and the fourth report on inter-laboratory trials carried out by Technical Committee F, has been published by the Textile Institute. The conclusion in this report is that, although variability within tests on a given machine may be reduced to a satisfactory level, the variability between tests on different machines may be great. For a sample of cotton gaberdine tested on one machine, the range of replicate tests was 19 - 20% for absorption and 2 - 4 ml.

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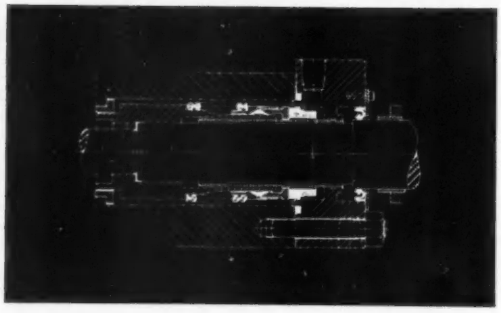

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for penetration; for the same fabric tested on ten machines, the ranges were 16 - 23% and 1 - 5 ml. The comparable ranges for a wool union gaberdine were 32 - 36%, 77 - 100 ml. and 21 - 34%, 57 - 120 ml. Technical Committee F does not consider, therefore, that, even when the test procedure is controlled more strictly than was required by T.T.S. No. 8, 1955, the method of test is sufficiently good to permit them to recommend it for publication as a British Standard.

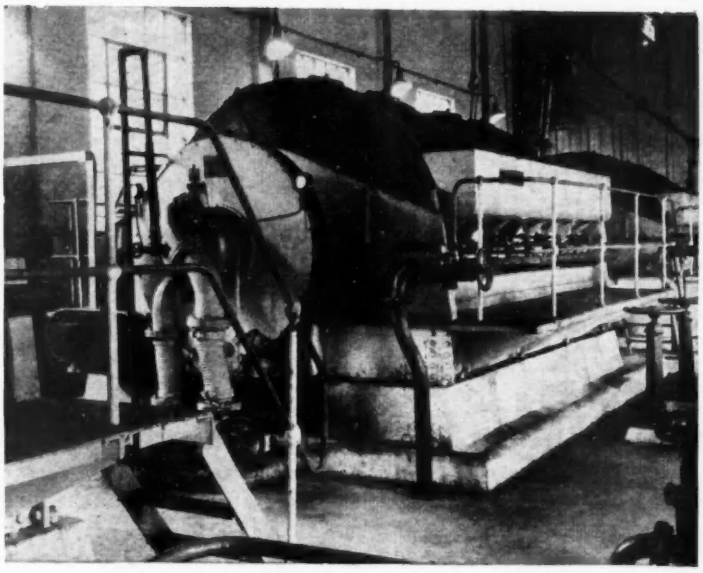
A "Recommended Procedure," which supersedes T.T.S.8, 1955, has therefore been prepared, and this has been approved by the Unification of Testing Methods Committee. Accordingly, it will be passed to the British Standards Institution for publication as an addendum to B.S. Handbook No. 11 and it is hoped copies will be available in the near future. Part 1 of the recommended procedure describes the method of test: Part 2 details the requirements to be met by the Bundesmann-type apparatus used for the test. Part 3 details the requirements to be met by the mechanical shaker used to remove surplus water from specimens exposed to the shower.

Imports of Textiles from China

Quota restrictions on imports from China of cotton and rayon yarns and cloth will in future extend to all manufactures of cotton, linen or man-made fibres except floor coverings and footwear and the open general licence has been amended accordingly. There will be a new quota for the import of the household textiles and other made-up goods excluded from the open general licence by this amendment. The quota will permit total imports at approximately the 1957 level. Any of these goods shipped to the U.K. before August 12, and covered by a bill of lading dated August 11, 1958, or earlier will be admitted without a licence as "goods in transit." All other shipments will be admitted only under an individual licence.

U.K. Wool Top Exports

Wool top exports from the U.K. reached a new record level during the first half of this year. B.o.T. returns show that shipments amounted to 44·1 million lbs., compared with 43·9 million lbs. for the first six months of 1957, when a new post-war record was established. China was the biggest buyer, taking 8·5 million lbs., India was second with 6·4 million lbs., and Canada third with 4·3 million lbs. Exports to most European countries, with the exception of Western Germany, were lower. Shipments of woollen and worsted fabrics and wool carpets all showed a decline. Woollen cloth shipments for the first six months of this year were 31·3 million sq. yds. (as against 35·8 million for the corresponding months of 1957), worsted cloth 16·9 million sq. yds. (17·7 million previously), and wool carpets 2·9 million sq. yds. (3·0 million previously). Wool imports into the U.K. during June, at 48·6 million lbs. (actual) were the smallest of any month since last November and some 9 million lbs. below those of June last year, according to latest returns issued by the Board of Trade. For the first half of 1958, the total amount of wool imported into the United Kingdom was 361·6 million lbs., compared with 406·3 million lbs. in the first half of 1957 and 402·6 million lbs. in the similar period of 1956.



Disc filters clothed with nylon have solved the problem of cleansing water heavily charged with dust particles from the blast furnaces at the Ebbw Vale works of Richard Thomas and Baldwins. Sludge from the settling ponds is reduced to an easily handleable cake in this plant, the only one of its kind in Britain which is in full working order. The nylon cloth, a 12 ozs. continuous filament twill, has a working life of three to four months. This photograph shows spare filter units waiting to go into action.

New Companies

Crow, Calladine, Rolph Ltd. Private. Reg. August 15. Capital £1,000. Objects: To carry on the business of Manufacturers and merchants in piece goods. L. P. Crow, C. Calladine, J. H. Rolph. Registered Office: 52 Mortimer Street, W.1.

Textile Fibres Ltd. Private. Reg. August 14. Capital £1,000. Manufacturers and dealers in tops, noils, yarns, etc. V. A. Hill, W. G. Walton. Registered Office: 34 Manchester Road, Bradford 5.

Ellenroad Ring Mill Ltd. Public. Reg. August 11. Capital £450,000. Cotton spinners, manufacturers, dyers, bleachers, merchants, doublers, and cotton waste dealers, etc. G. E. Gardiner, J. R. Thompson, N. Horsfield, P. B. Tanner. Registered Office: Bentgate Street, Newhey, near Rochdale.

Bernard Fisher and Co. Ltd. Private. Reg. August 11. Capital £1,000. Manufacturers of rayon, silk, nylon, etc. B. Fisher, S. M. Marks. Registered Office: 11 Stanhope Gate, Park Lane, W.1.

Stuart Kenson Ltd. Private. Reg. August 11. Capital £2,000. Manufacturers and dealers in cloth, etc. G. R. Edmondson, E. B. Lofthouse. Registered Office: 14 Castlegate, Clitheroe.

Worsted Manufacturing Co. Ltd. Private. Reg. Aug. 6. Capital £100. J. Teba, N. Reiser. Registered Office: 2 Princes Street, W.1.

O. and T. Gallagher Ltd. Private. Reg. July 8. Capital £10,000. Importers and exporters of waste, flax, tow, etc. H. Jackson, R. A. Jackson and M. J. F. Jackson. Registered Office: 41/53 Nelson Street, Belfast.

Baxters (Manufacturers and Distributors) Ltd. Private. Reg. August 5. Capital £100. Manufacturers and importers of cloth, wool, worsted, and other textiles, etc. S. R. Baxter and R. R. Baxter. Registered Office: 38 Great Portland Street, W.1.

Coddington and Woods Ltd. Private. Reg. August 5. Capital £2,000. Cotton brokers and merchants, etc. W. B. Coddington and A. B. Coddington, J. Woods and E. Woods. Registered Office: 44 Cotton Exchange Buildings, Liverpool 3.

Trentham Textiles (1958) Ltd. Private. Reg. August 1. Capital £2,000 in £1 shares. Spinners, weavers and manufacturers. F. Lord and A. Cherry. Registered Office: 11 Albert Square, Manchester 2.

Bothwell Ltd. Private. Reg. in Belfast July 3. Capital £100 in £1 shares. Manufacturers and dealers in linen yarns, etc. M. Boles, M.McLean. Registered Office: Hilden, Lisburn, Co. Antrim.

Y. (B) Ltd. Private. Reg. August 7. Capital £3,000 in £1 shares. Manufacturers of cotton, worsted, woollen, mohair, etc. H. G. Reinberg, J. M. Richards. Registered Office: 17 Salem Bradford.

C. H. Clarkson (Manchester) Ltd. Private. Reg. August 8. Capital £500 in £1 shares. Distribution, import and export and purchase and sale of goods. Agents for textile fabrics and goods, etc. C. H. Clarkson, Miss B. M. C. Read, A. C. Underwood. Registered Office: 3 Stevenson Square, Manchester 1.

M. Warm Ltd. Private. Reg. August 8. Capital £1,000 in £1 shares. Manufacturers of and dealers in cotton, art and pure silk, cloth, wool, worsted, etc. M. Warm and G. Warm. Registered Office: 15a Nicholas Street, Manchester 1.

John Bradley and Son (Nelson) Ltd. Private. Reg. March 25. Capital £3,000 in £1 shares. Manufacturers and dealers in cottons, linen, jute, woollens, etc. Registered office: Hendon Mill, Nelson, Lancs.

Paul F. Pearson Ltd. Private. Reg. March 28. Capital £5,000 in £1 shares. Wool merchant and importer. Registered office: Tatler Chambers, Thornton Road, Bradford, 1.

A.C. PERIGRIP BRAKES by METROVICK

Metrovick Perigrip brakes are the outcome of extensive investigation into the mechanical, magnetic and electrical characteristics of brakes. They are exceptionally simple to adjust and dismantle and they are invaluable for use with cranes, hoists, haulages, rolling mill auxiliaries, machine tools, certain textile drives and indeed for any drive where POSITIVE STOPPING is required.

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RECENT TEXTILE PATENTS

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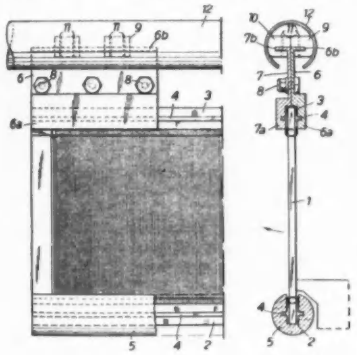
781,345 Loose Reed Loom

E. BAUMGARTNER-RIESER, *Weinbergstrasse, 15 Rüti, Zurich, Switzerland.*

Describes a novel arrangement of the reed on a loose reed loom. The fine reed 1, is provided at each edge with a collar 2 and 3, which is formed by a rail and has a square profiled rib 4 on both sides. Slipped over the collar 2 is a bound rod 5 which is provided with a corresponding recess. Each reed is provided with a two-part suspension member 6, 7, connected with each other by screws and nuts 8, and define together with their thickened bottom portion 6a and 7a, a recess serving for the reception of the collar 3 which is formed like the collar 2, while the cross section of the recess also corresponds to that of the casing-rod 5. The parts 6a and 7a form portions of the

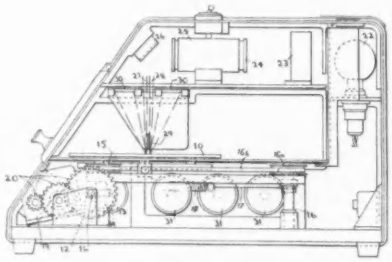


top reed casing and are provided with an extended end leg 6b and 7b, respectively, upon which two in series arranged holding pieces 9 and 10 are placed that are retained by two pins 11. The holding pieces 9, 10 are opposite each other in pairs and bear against each other so that together they form a corresponding holding body 9, 10. The pieces 9 and 10 are in a supporting bar 12 which is slotted in its lower portion. The periphery of the holding pieces is curved to fit the inner surface of the bar, whereby the suspension member 6, 7 is connected to the bar 12. An oscillating suspension is thus provided for the reed on the bar 12 secured to the loom slay.

781,453 Apparatus for Measuring Staple Length

BRITISH COTTON INDUSTRY RESEARCH ASSOCIATION, *Shirley Institute, Didsbury, Manchester.*

An improved method of measuring the staple length of fibres. The instrument constructed to test three samples simultaneously, comprises three separate optical assemblies arranged in line one for each sample, and a platform 10 movable below the assemblies. Means for moving the platform comprises a knob coupled through a worm 12 and worm wheel 13, the latter

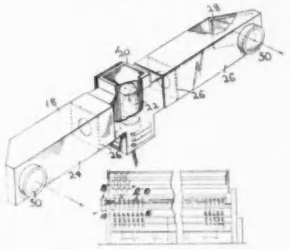


mounted on a shaft 14 to the upper end of which is attached a drum 15. At the rear is a second shaft 16 carrying a drum 16*a* and having a spring return system consisting of a cord 17 and coil spring 18. A thin steel tape 16*b* is secured at its ends to the drums 15 and 16*a* and the tape is fastened to the platform 10. Adjacent the shaft 11*a* of the knob is a resettable Veeder counter 19 coupled through gearing 20 to the shaft and calibrated to indicate linear movements. Each optical system comprises a lamp 22, condenser 23, slit mask 24, lens system 25, and mirror 26, for projecting on to the platform two beams 27, 28 of light falling as parallel lines on to the platform at a spacing of between $\frac{1}{16}$ and $\frac{1}{8}$ inch apart. Depending from the superstructure is a partition 29, the edge of which comes close to the platform and immediately between the two lines of light. On each superstructure, and arranged to "observe" light reflection from each line of light is a photo-electric cell 30. The six photo-electric cells from the optical system are coupled together, three and three, so that those on the same side are additive and the two groups connected to opposite sides of a sensitive galvanometer so as to be in opposition. Suitable variable potentiometers 31 are included in the circuits to provide compensation for any differences in light intensity of the images and in sensitivity of the individual photo-cells so that "zero" setting for the galvanometer may be effected.

781,458 Thread Illuminators for Textile Machines

MEINERS OPTICAL DEVICES LTD., 121 *London Wall, London.*

Describes thread illuminators for use on spinning and other textile machines. The machine shown is a conventional ring spinning frame having a creel 10. The threads 12 pass down through a thread guide 14 below which they are laid on the bobbins 16. On one end of the frame is mounted the illuminator 18 which consists of a casing providing a central housing 20 for a lamp 22 and two trunks 24. Within each trunk, there is an apertured plate 26 forming an optical stop and a plane mirror 28 on the side of the stop is set at 45° to the longitudinal axis of the trunk. In one face of each trunk, there is a lens 30 which collects the light reflected by the mirror. The illuminator is mounted on the machine



so that the lenses 30 project light from the lamp across the threads as they pass down to the thread guide 14. The lamp is a mercury vapour lamp.

781,463 Detector for Periodic Variations in Speed of Moving Surfaces

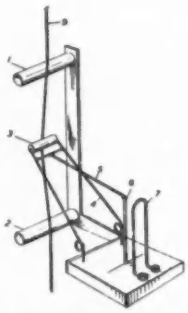
BRITISH COTTON INDUSTRY RESEARCH ASSOCIATION, *Shirley Institute, Didsbury, Manchester.*

An instrument for detecting and measuring the frequency of periodic variations in speed comprises a system mounted so as to be capable of oscillation about an equilibrium position, in which position the system is normally resiliently retained. The system includes a member adapted for rotation by contact with the surface, a fly wheel also rotatable due to the contact, and one or more reeds of known natural frequencies. On variation in the speed of the surface, the fly wheel tends to keep the speed of rotation of the member constant, the resultant reaction between member and surface causing a movement of the system from its equilibrium position. This movement is opposed due to the resilient mounting of the system so that the system oscillates at the frequency of the periodic variations, whereby, if the frequency of such variations coincides with a natural frequency of vibration of a reed the latter vibrates with a large amplitude, and gives visual indication of the frequency of the periodic variations.

781,567 Device for Measuring Yarn Tension

BRITISH JUTE TRADE RESEARCH ASSOCIATION, *Kinnoull Road, Kingsway West, Dundee.*

A device for measuring tension in yarns, filaments, etc. 1 and 2 represent yarn guides mounted on the same base as a variable condenser. The feeler 3 presses on the yarn 9 and the feeler is mounted on a stirrup-shaped member 4, arranged to provide a suitable deflecting force at the yarn. Coupled to the stirrup is a link 5 of insulating material, which conveys movements of the feeler to a variable condenser. The variable condenser comprises a moving part 6 and a fixed part 7. 6 is a short length



of wire pivoted at its lower end so that it can move in the same plane as the yarn, and link 5 is rigidly coupled to the upper end of the wire. The fixed part of the condenser is formed by a loop of wire 7 carried on the insulating base which also supports the pivot for part 6. When used for determining yarn tension the variable condenser is connected by means of co-axial cable to an electronic capacitance measuring unit.

781,716 Bleaching Method

J. Dungler, 5 *Lange Gasse, Basle, Switzerland.*

Process for chemically bleaching cotton, flax, hemp, jute, "nylon," "perlon," etc. The material is saturated with an acid so as to obtain even penetration of the acid throughout the whole of the fibrous structure of the material. The saturated material is superficially treated with a chlorine compound bleaching agent and the treated material is heated to effect chemical reaction.

781,741 Wet Processing Fabric

Springs Cotton Mills, *Lancaster, South Carolina U.S.A.*

Apparatus for the wet processing of fabric web in open width form. The method comprises immersing and withdrawing the fabric web a number of times in and from a treating liquor bath, and counterflowing the treating liquor bath in relation to the direction of travel of the fabric web. The flow of treating liquor in the bath is channelled transversely widthwise of the open width of the fabric web at each immersion.

781,798 Loom Harness

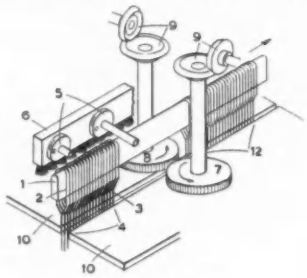
Steel Heddle Manufacturing Co., 21st *Street and Allegheny Avenue, Philadelphia, Pennsylvania, U.S.A.*

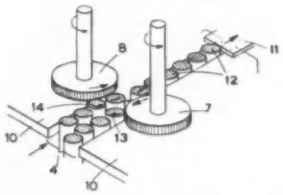
Describes the provision in a loom harness, of means whereby wear at the place of connection between certain of the parts will be eliminated. The harness comprises a heddle frame having top and bottom rails, and heddle rods comprising thin flat metallic strips mounted in the frame. Means for supporting the heddle rods comprises at each location, a plate secured to the rod, and a separate bolt mounted in one of the rails of the frame, the bolt having a head portion engaging the plate. Releasable means are supplied for positively clamping the head portion of the bolt to a portion of the plate.

781,937 Device for Arranging Healds

Zellweger A. G. Apparate- Und Maschinen-Fabriken Uster, *Uster, Zurich, Switzerland.*

Describes a device for arranging healds. On a heald rod 1 is a stock 4 of healds 2, which tend to lie side by side in pairs. A brush 6 is eccentrically supported on two discs 5 which move the brush so that it pushes the heald stock towards the right. Two friction wheels 7 and 8 with knurled edges are driven synchronously by two pairs of bevel wheels 9; the knurled edges of the wheels come into contact with the eyelet necks 3 of the healds. Two guide plates 10 form a slot, the left part of which is sufficiently wide to provide space for the eyelet necks lying side by side. The healds bank up at a separating device 11 for the healds. As soon as one heald has been separated by this device, the heald bank





arranged in one row can move forwards by one heald. If healds are pushed in pairs against the friction wheels, the knurled edge of wheel 7 pushes the eyelet neck 13 back, and simultaneously, the corresponding edge of wheel 8 tries to push the eyelet neck 14 forwards and thereby increases the efficiency of the brush 6. In this manner, the stock of healds lying side by side is transferred into the stock 12 which is in one row. If the healds are in a single row as they approach the friction wheels, they can contact either one of the friction wheels. As the feeding action of the brush is stronger than that of the wheel 7, healds in the bank 4 are, at all events, transferred into the bank 12 in a single row.

781,942 Spindle Bobbin Mount

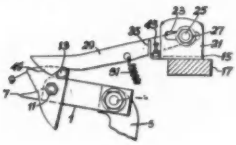
Perlinger and Richter Primatex, *Furth i. Wald, Germany.*

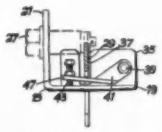
A method of mounting a bobbin on a spindle includes spaced resilient sleeves, with weights arranged within the sleeves, which may then be relatively soft. The spool is in this way given greater freedom to adjust itself to spin about its principal axis. The location of the spool on its mounting is entirely secure when rotating, yet no appreciable wear is caused over a long period of use, with repeated putting on and removal of the spool. The sleeves are located by co-axial discs, which have on their edges guide flanges centring the sleeves they hold. By further surrounding the weights with a hoop of steel care is taken that the outward movement of the weights when the spindle is rotated without the spool is limited.

781,991 Weft Clamping Device for Looms

W. V. Gledhill, *Ty Byrn, Holmfirth, and* A. Chappell.

A device for use in a bobbin change weft replenishing loom, for opening the jaws of a thread gripper. The weft grabber 1 is fixed to the upper end of a shuttle position detector arm 5. The grabber has a fixed jaw 7 and a movable jaw 9, pivoted to the grabber at 11, and a pin 13 projects from the jaw 9. A bracket 15 is fixed to the breast beam 17 and at one side of the base 19 of the bracket is an upright member 21 in which is formed a long horizontal slot 23. A stud 25 passing through this slot has a nut 27 one side and at the other side forms a pivot for an arm 29 which extends over the path of the thread gripper. At the rear of the base is a member 35 formed with a deep recess 37 from its upper edge, the purpose of this recess being to control transverse movement of arm 29. Pivoted





about a stud 39 in the member 35 is a stop bar 41, and a screw 43 passes through the bar and presses against the base. By adjusting the screw 43, the height of the free end 47 of the bar 41 can be varied. The arm 29 rests upon the end of the bar 41 in normal position. Arm 29 is formed with a snout 49 the purpose of this snout being to engage the pin 13 on the thread grabber. A tension spring 51 has one end connected to the arm and the other end is fastened to a fixed part of the loom. In use, as the grabber moves backward, its jaw 9 is turned about pivot 11 by engagement of pin 13 with the snout 49.

782,015 Yarn Fusion Control

British Celanese Ltd., *London.*

A yarn tension meter for the measurement and control of tension in a running yarn comprises a member movable to either side of a mean position and subjected to the force of the tension in the running yarn. An electromagnet applies to the member a balancing force opposing the tension. Means are provided for supplying energizing current to the electromagnet and for effecting a continual increase or decrease in the current so long as the movable member is on one side or the other of the mean position. The magnitude of the energizing current is thus made to vary with the tension in the running yarn, and can be measured by a suitably calibrated instrument.

782,028 Process for Improving Wool Properties

O. B. A. Nilssen, *St. Jörgensgate* 8, *Bergen, Norway.*

A process for the improvement of wool, especially a reduction of its tendency to become felted and an increase of its dye absorption rate. The wool is treated with a dilute solution of a high molecular weight, strong, organic base, the molecular structure of which is such that it does not diffuse, or diffuses very slowly, into the

wool fibres. In one example, 10 G. wool are treated for 5 min. with 1 litre of a solution of 5 g/l cetyldimethyl-ethylammonium hydroxide at a temperature of 40°C. The wool is rinsed with a large volume of water and neutralised by treatment with a 3·5 g/l solution of hydrochloric acid, and again rinsed. Wool treated in this manner is found to possess a greatly improved power of absorbing dyes and a considerably reduced tendency to become felted.

782,152 Thread Guide

FLEMING, REID AND CO. LTD., *The Worsted Mills, Greenock, Scotland.*

Describes a guide for spinning, twisting and like machines. The guide eye, which is situated between the feed mechanism and the yarn package, comprises a support rod 1 which at its top end is bent into an isosceles

triangle enclosing a space 3, the top edge 5 of which is horizontal. The end 6 overlaps another part of the bent portion 4 so that the space 3 is completely enclosed, and thread passing through cannot escape without being broken.

782,176 Double Twister

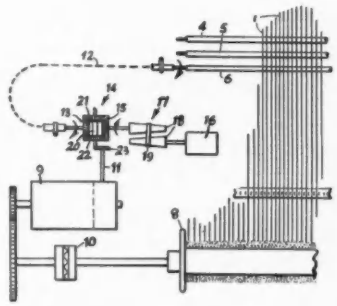
H. POLLARD, *Cliffe Cottage, Track Road, Batley, Leeds.*

A machine for imparting a double twist to yarns, in which the package holder is prevented from movement by a pair of sliding catches mounted on the holder each adapted to engage a corresponding fixed bracket. The catches are controlled by a cam carried by the vertical spindle, the contour of the cam being such that one or other of the catches is always in engagement with its corresponding fixed bracket and a gap is always left for the upward passage of the yarn from the flyer disc.

782,199 Constant Speed Mechanism for Warping Machines

COURTAULDS LTD., *London.*

A method of effecting smooth changes in the rate of rotation of a beam for maintaining a constant speed of take-up of the warp threads. The beam 8 is rotated by an electric motor 9 through a clutch 10 by which the operator can disconnect the drive to the beam at will. The motor is of the type in which speed may be controlled by altering the position of the brushes by a shaft 11. During winding, the rollers 4, 5, 6 are rotated by the threads 1, and a flexible cable 12 connected at one end to roller 6 transmits this drive to a crown wheel 13 of a differential gear 14. At the same time a second crown wheel 15 is driven by a constant speed motor 16 through a variable gear 17 comprising two cones 18 coupled together by a movable band 19. The crown wheels 13, 15 are driven in opposition so that when their speeds are equal, a cage 20 supporting planetary pinions 21, 22 meshing with the wheels 13, 15 is stationary. If the speed of wheel 13 is different from wheel 15, the



cage will rotate and drive a bevel 23 fixed to shaft 11, which in turn shifts the brushes in the motor. After threading up, the operator sets the band 19 to correspond to a desired speed of take-up. The desired speed of take-up is reached when wheel 13 is rotating at the same speed as wheel 15. At this point, the cage 20 is stationary, the brushes are stationary and the motor is driving the beam at a constant speed. As the warp builds up on the beam the effective diameter of the beam increases so increasing the speed of take-up. Consequently, roller 6 is rotated at a higher speed and this is transmitted to the wheel 13. The cage 20 is caused to rotate causing the brushes of the motor to be moved until the speed falls so reducing the take-up speed of the threads on the beam to the desired value.

782,208 Expanding Comb for Beaming Machines

W. H. BARKER, *St. Georges Works, Blakey Street, Blackburn.*

A dent for an expanding comb for beaming and similar machines. The dent has a portion of flattened section for engagement by the springs of the comb, and a portion of circular section adapted to protrude from the springs.

782,412 Improved Cloth Shearing Machines

W. WHITELEY AND SONS LTD., *Prospect Ironworks, Lockwood, Huddersfield.*

A cloth shearing machine is provided with a slipping clutch, the input member of which is rotated at a speed directly related to that of the cloth rollers and the output member is adapted when rotated to move a cutter away from the path of the cloth adjacent the cutter. Stop means normally prevent rotation of the output member, and means are supplied for releasing the output member to allow it to rotate whenever a joint in the cloth is detected by a detector device.

782,600 Spinning or Twisting Device

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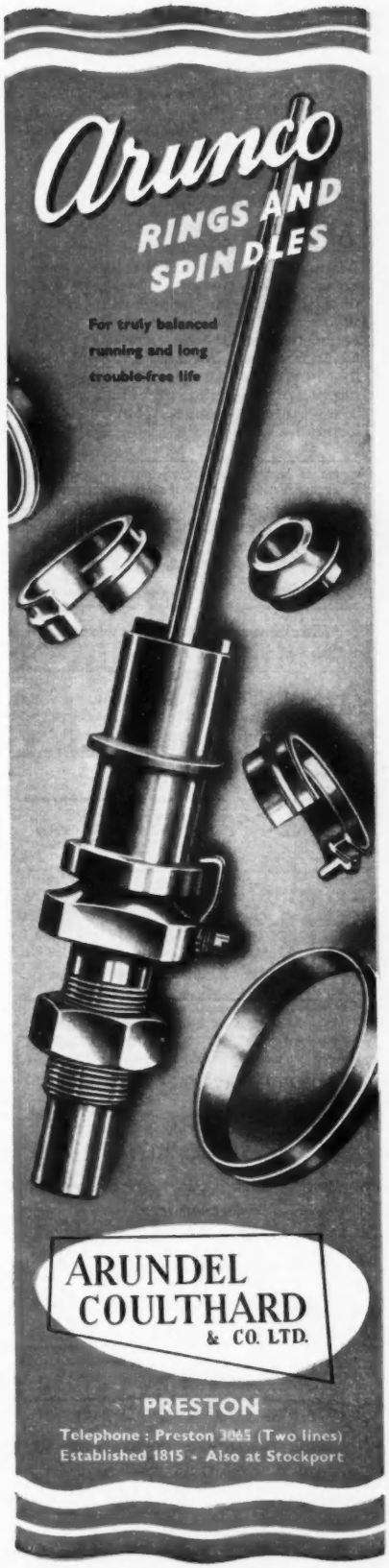
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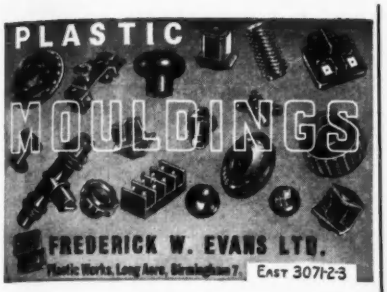

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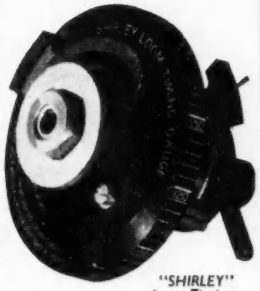

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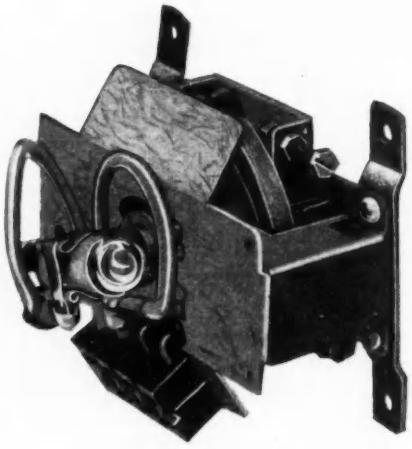

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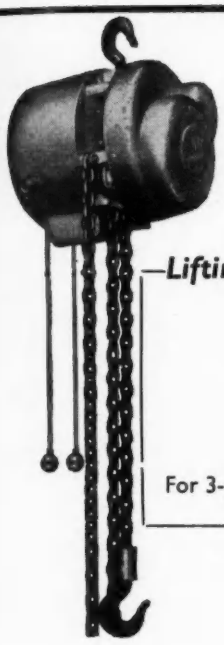

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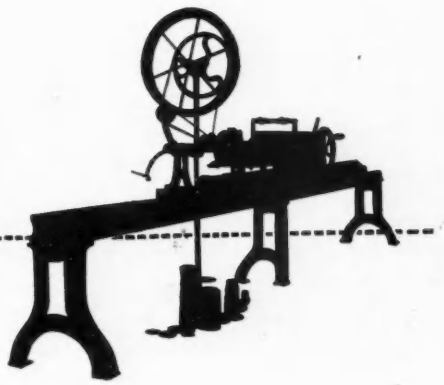

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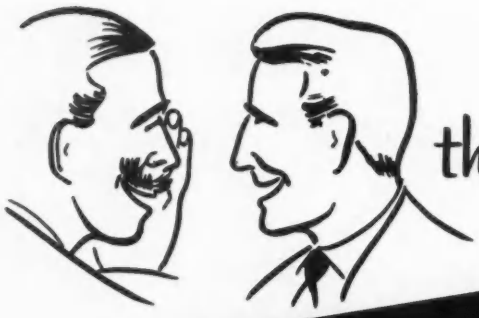

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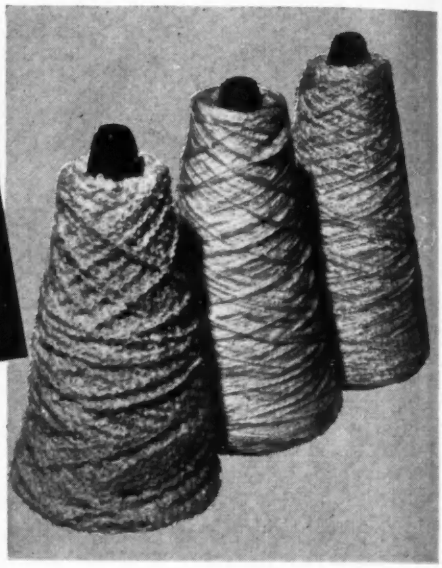

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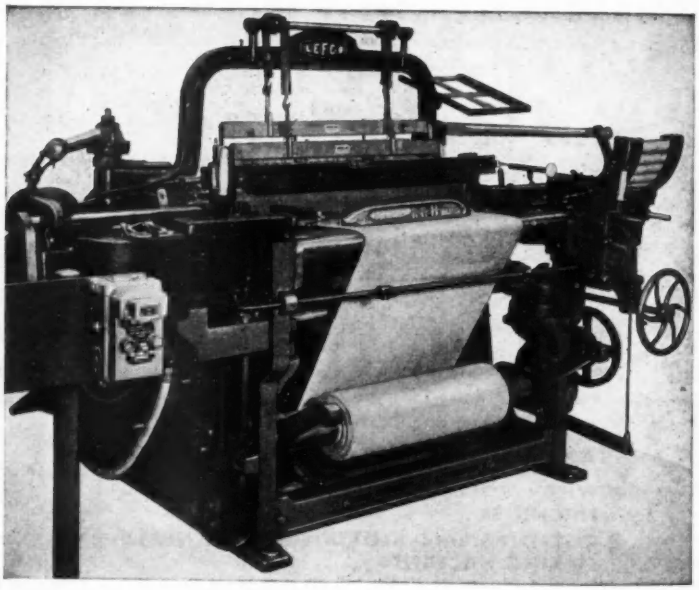

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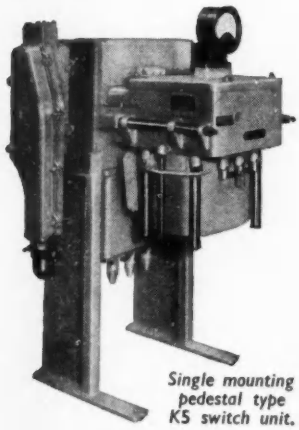

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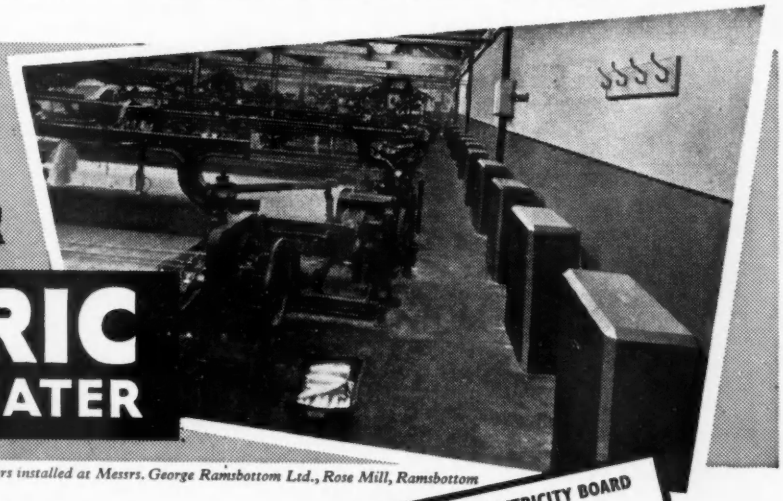

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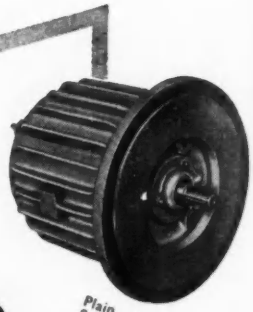

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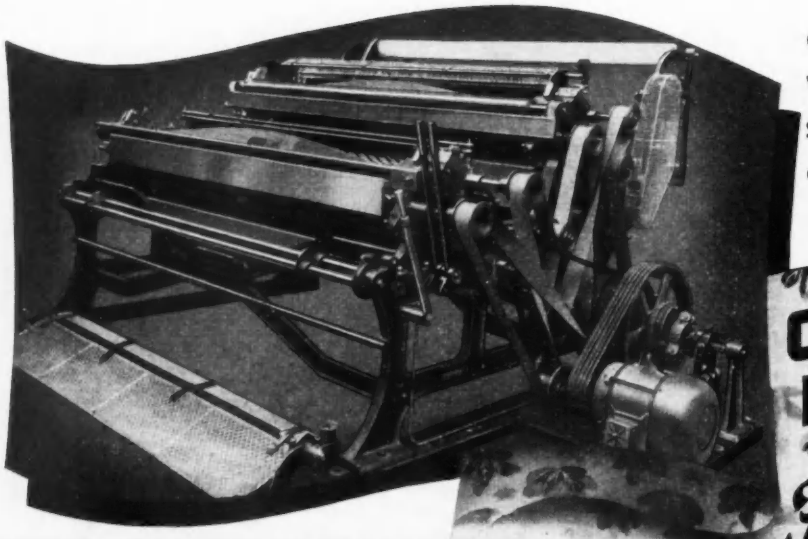

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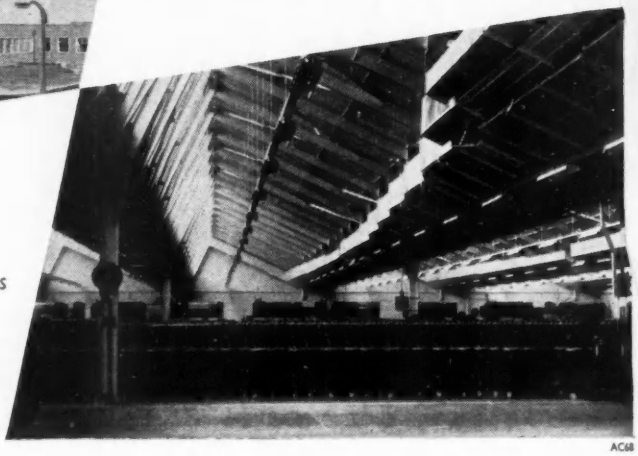

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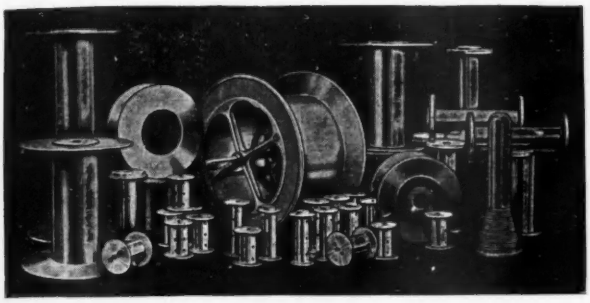

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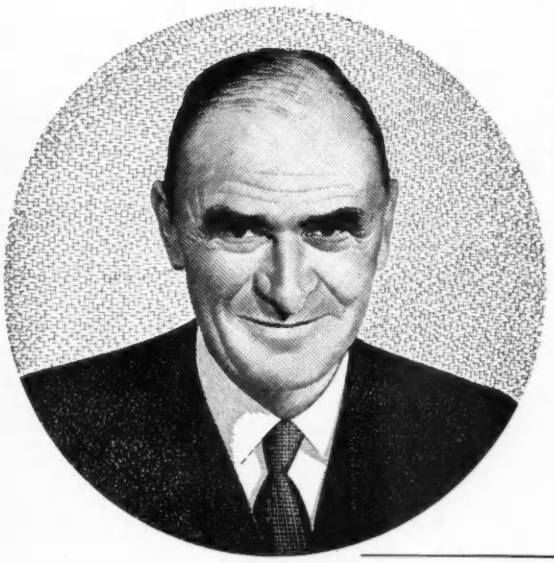

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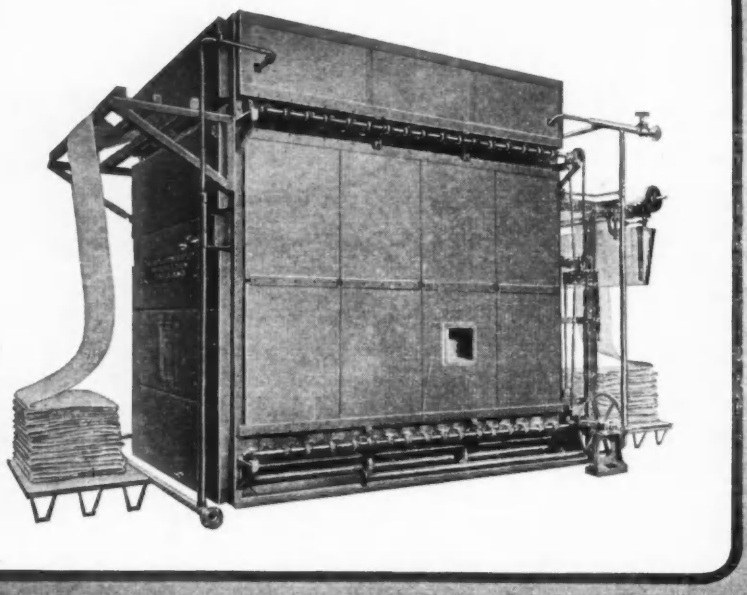

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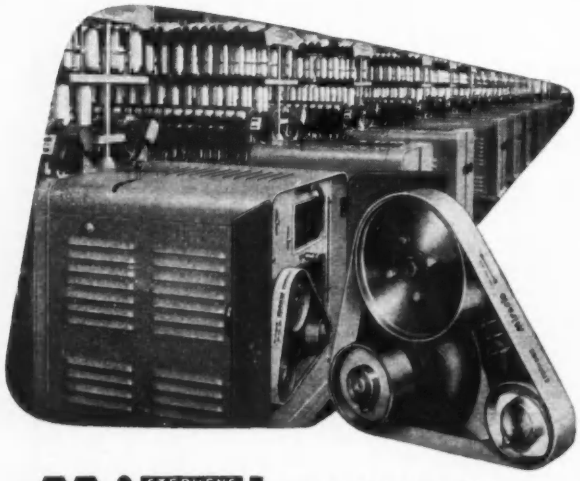

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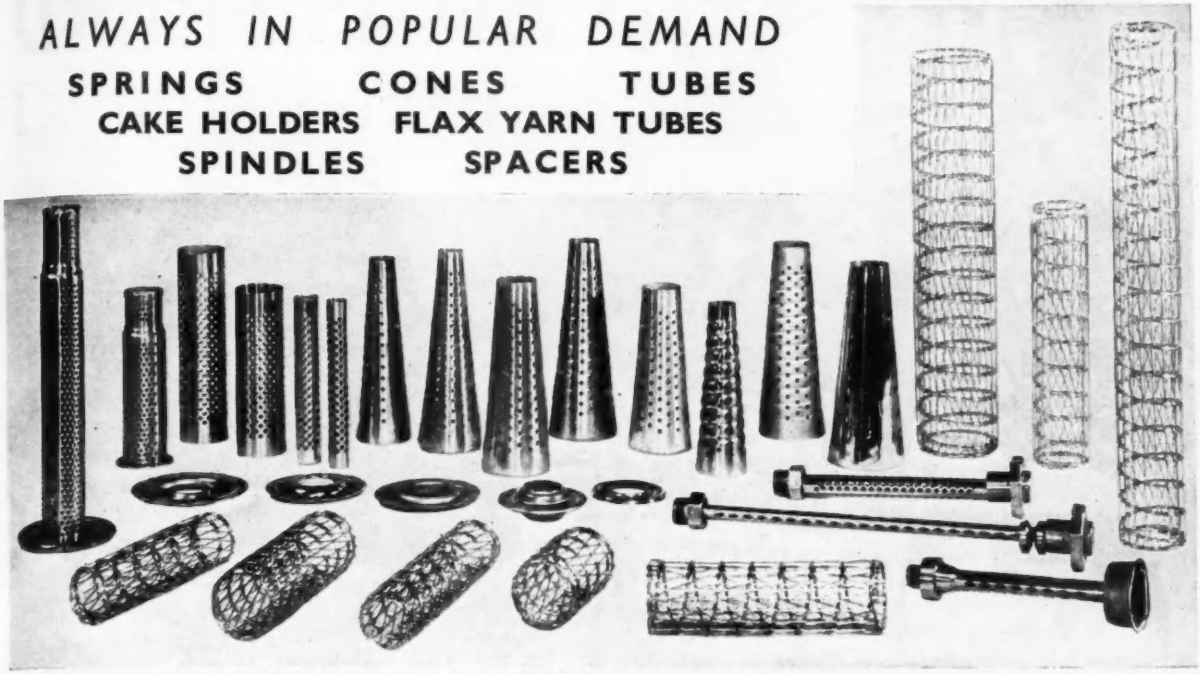

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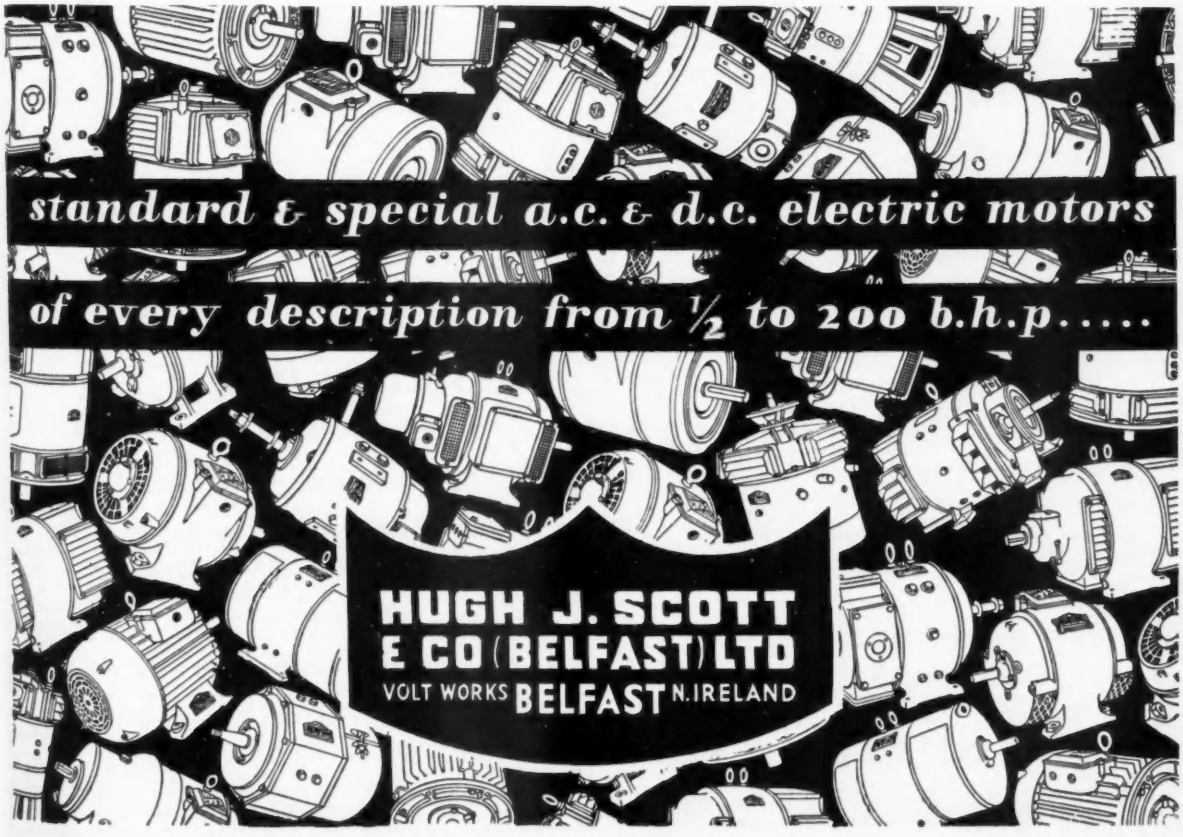
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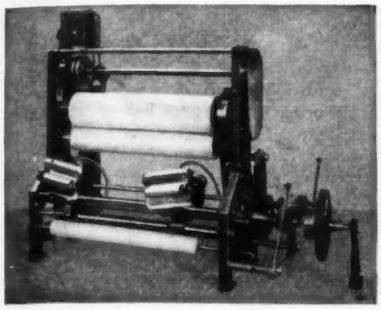

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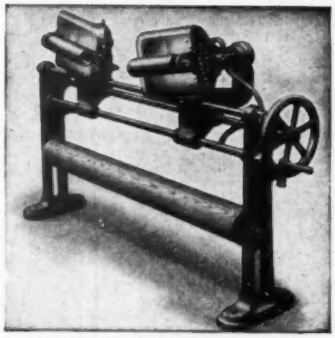

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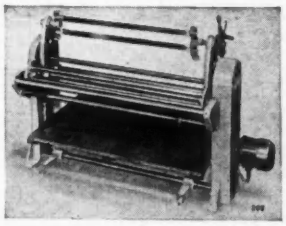

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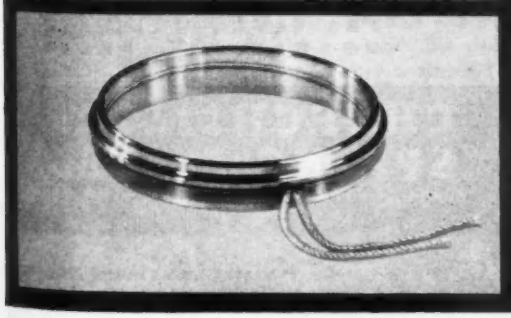

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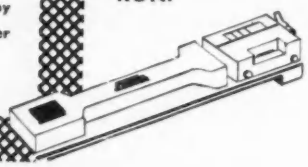

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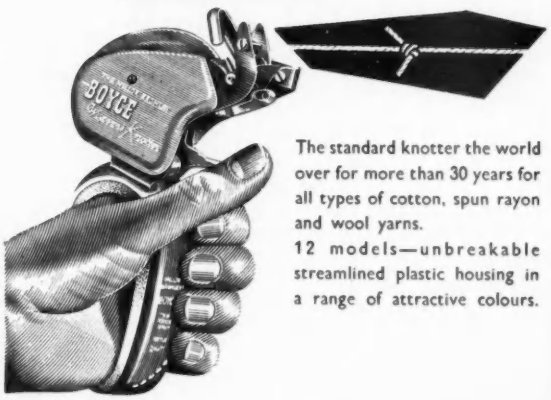

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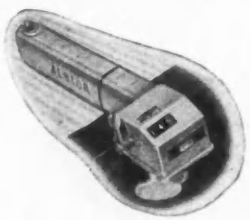

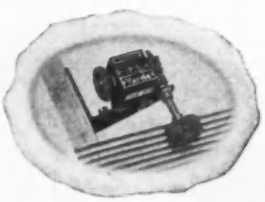

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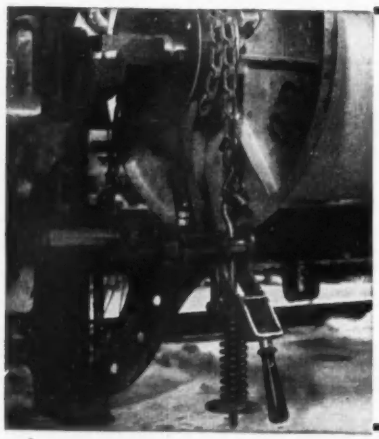

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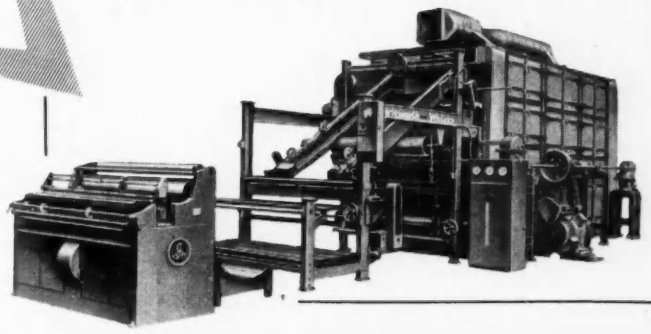

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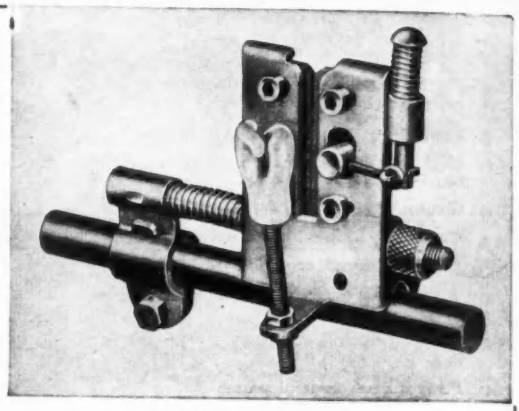

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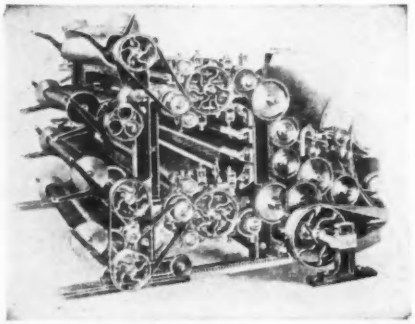

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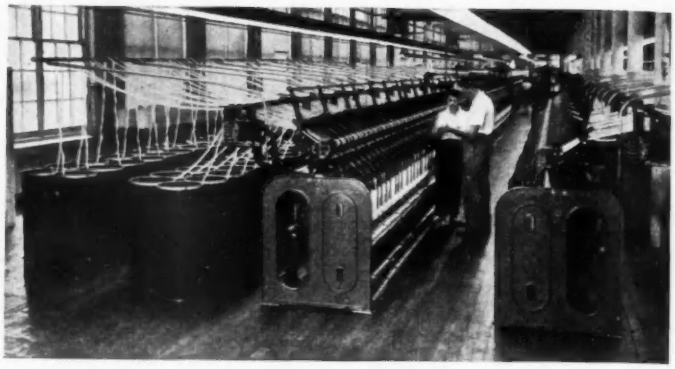

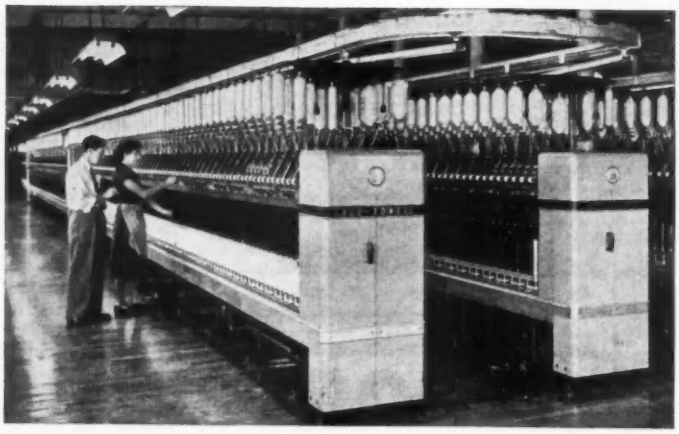

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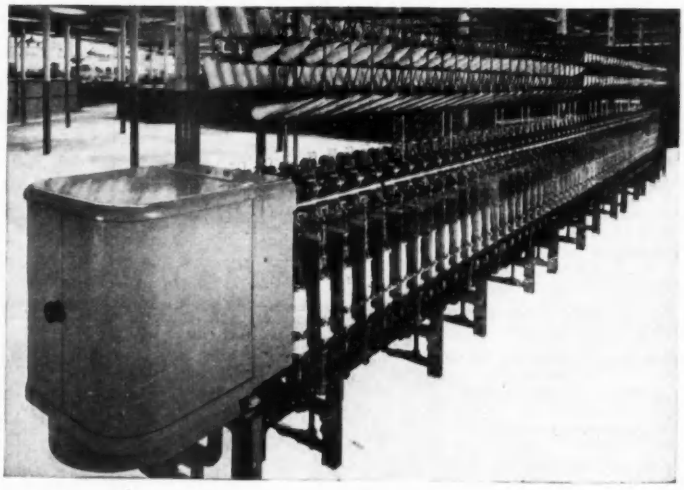

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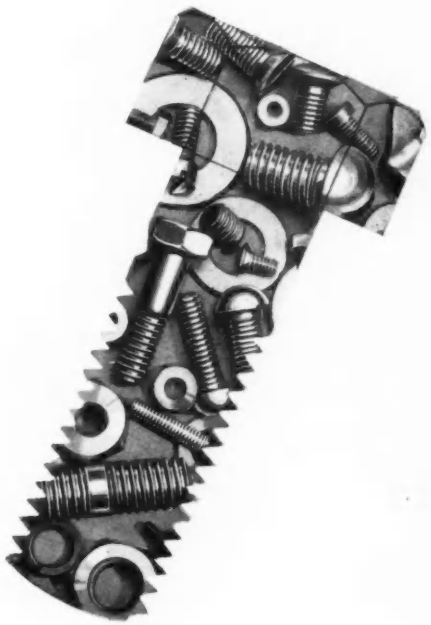

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